

DOCUMENT RESUME

ED 326 413

SE 051 772

TITLE Adaptation. Community Study Unit, Grade 6. Teacher Edition, Field Trip Guide for Teachers, Student Classbook and Student Field Book.

INSTITUTION Lee County School District, Ft. Myers, FL. Dept. of Environmental Education and Instructional Development Services.

PUB DATE 89

NOTE 145p.; For related documents, see SE 051 766-777. Contains colored pages and some broken type which may not reproduce well.

AVAILABLE FROM Department of Environmental Education, Lee County Schools, 2055 Central Avenue, Ft. Myers, FL 33901 (\$3.50).

PUB TYPE Guides - Classroom Use - Guides (For Teachers) (052) -- Guides - Classroom Use - Materials (For Learner) (051)

EDRS PRICE MF01 Plus Postage. PC Not Available from EDRS.

DESCRIPTORS *Ecology; Educational Objectives; *Elementary School Science; Environmental Education; *Field Trips; *Grade 6; *Interdisciplinary Approach; Intermediate Grades; Science Activities; Science Education; Teaching Guides

IDENTIFIERS *4Mat System Model

ABSTRACT

This unit has been created to provide experiences with the concept of adaptation. Adaptation can be defined as changes resulting from interactions of the needs of a species or cultural object and the opportunities presented by the environment. Most behaviors and physiological characteristics of plants are related to adaptation. An understanding of the concept of adaptation will help students interpret conditions they may encounter in the future. In this unit, students explore the concept of adaptation through a variety of activities, ideas and experiences. A field trip experience to Sanibel Island is featured. This set of documents includes an overview, objectives, a field trip guide for teachers, and four sections of activities. Appendices include the 4Mat model, an application of this unit to the 4Mat model, a cognitive pre/posttest, a student book, a glossary, a discussion of scheduling considerations, and a parent permission form. (CW)

* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *

ED326413

TEACHER EDITION

PERMISSION TO REPRODUCE THIS
MATERIAL IN MICROFICHE ONLY
HAS BEEN GRANTED BY

Environmental
Education

TO THE EDUCATIONAL RESOURCES
INFORMATION CENTER (ERIC)

U.S. DEPARTMENT OF EDUCATION
Office of Educational Research and Improvement
EDUCATIONAL RESOURCES INFORMATION
CENTER (ERIC)

☒ This document has been reproduced as
received from the person or organization
originating it.

☐ Minor changes have been made to improve
reproduction quality.

• Points of view or opinions stated in this docu-
ment do not necessarily represent official
OERI position or policy.



ADAPTATION

COMMUNITY STUDY UNIT

GRADE 6

LEE COUNTY SCHOOLS

SE051772



THE SCHOOL BOARD OF LEE COUNTY

2055 Central Avenue
Fort Myers, Florida

Colonel Tedson S. Timberlake
Chairman

Grace D. Bartleson
Vice Chairman

Mary M. Laurel
Member

Suzi Martin, Ph.D.
Member

Barbara Wallace
Member

Karl Engel
Superintendent

Dr. Charles Godwin
Assistant Superintendent for Instruction

Dr. J.P. Lutz
Director, Elementary Education

Dr. William Hammond
Director, Instructional Development Services and Environmental Education

Overview

This community study unit is designed to acquaint sixth grade students with the concept of ADAPTATION. The classroom activities and the instructional field trip will lead the students to discover what adaptation is, and how this phenomenon affects plants, animals, people, and the worlds in which we live. At the completion of this unit, the students should be able to apply their newly acquired knowledge to new situations and topics such as endangered species and extinction.



TABLE OF CONTENTS

Overview	1
Continuum Connections.	4
Concepts / Objectives.	5
Introduction	6
SECTION 1 - A Reason for Learning.	7
Who Needs A Thumb Anyway?	7
Stranded on Coconut Island.	8
The Last Wish of the Fish	8
Plane Facts	9
How Does It Do It?.	10
Convergent Critters	10
Adaptation.	11
SECTION 2 - Teaching and Learning.	13
What's My Line?	13
Feet For Thought.	15
"Ding" Darling: Cartoonist and Conservationist.	16
Vocabulary.	17
Films	17
SECTION 3 - Trying It Out.	19
Field Trip.	19
Field Trip Leadership Responsibilities.	21
SECTION 4 - Self Teaching & Extending.	23
Insect Specialties.	23
Invent-A-Bird	23
Over-Specialization	25
Human Adaptations	25
Adaptation Artistry	28
APPENDIX	29
The Complete 4MAT System Model.	31
4MAT System Model for Adaptation Community Study Unit	33
Cognitive Pre/Post Test	34
Answer Key.	37
Self Evaluation	38
Glossary.	39

Student Classbook - ADAPTATION	41
What's My Line?	43
Feet For Thought.	44
"Ding" Darling: Cartoonist and Conservationist.	45
Cartoon	51
Cartoon	53
Insect Specialties.	55
ADAPTATION: Community Study Guide Student Edition.	61
Scheduling Considerations	93
Parent Permission Form.	94



SCIENCE

- 4 Examine the various processes used in the scientific method.
- 5 Develop process skills needed to conduct scientific investigations.
- 5 Observe and describe objects in detail. Classify objects by common characteristics.
- 14 Describe plant adaptations to changing conditions.
- 15 Recognize how animals move in response to internal and external stimuli.
- 16 Describe animal adaptations to changing conditions.
- 17 Describe how animals use instinctive and learned behavior to increase their chances of survival.

SOCIAL STUDIES

- 10 Discuss how environment influences the development of cultures.
- 27 Recognize the difference between physical and cultural traits.
- 27 Research and report on a culture or ethnic group showing how that culture has been influenced by environment.
- 33 Recognize a definition of the term conservation.
- 33 Explain specialization and division of labor.
- 33 List some advantages and disadvantages of specialization.
- 35 Define interdependence as a mutual arrangement by which both sides benefit.

ENVIRONMENTAL EDUCATION

Change is a continuous process in the universe.

Adaptation is a response to change in the environment or culture.

Each individual is interrelated with its environment.

Heredity and environment interact.



4

7



CONCEPTS

1. All organisms have (special) structural and behavioral adaptations which enable them to live in a particular habitat.
2. Humans are able to consciously adapt their behavior and structures to fulfill their needs.
3. Conservation is the wise use of natural resources.

OBJECTIVES

Students will be able to:

1. distinguish between structural and behavioral adaptations;
2. describe the particular functions of the bills and feet of various birds;
3. describe some of the contributions of J.N. "Ding" Darling to the conservation movement;
4. state one example each of human structural and behavioral adaptations;
5. identify ways in which people have adapted their environment to fit their needs;
6. identify ways in which people themselves have adapted to live in particular environments.



Introduction

This unit has been created to provide experiences with the concept of adaptation. Adaptation can be defined as changes resulting from interactions of the needs of a species or cultural object and the opportunities presented by the environment. Most behaviors and physiological characteristics of plants and animals are related to adaptation. An understanding of the concept of adaptation will help students interpret conditions they may encounter in the future.

Students will explore the concept of adaptation through a variety of classroom activities, ideas, and experiences.

A field trip to the J.N. "Ding" Darling National Wildlife Refuge on Sanibel Island will provide an opportunity to actually observe structural and behavioral adaptations of birds. These concepts will be related to "people created" adaptations found in the human-designed environment. The unit culminates with activities in which students apply their knowledge and observations to new situations and areas of personal interest.



A Reason for Learning

Section 1

The activities in this section should provide students with experiences that directly link the unit concepts with their personal life experiences. Students must also have a chance to discuss those connections with one another. In this initial phase of the unit students should discover a reason for learning the instructional concepts.

1. PRE-TEST

The Cognitive Pre/Post Test may be found in the Appendix. (p. 34)

2. WHO NEEDS A THUMB ANYWAY?

At the beginning of the class period, tape each student's thumbs to his/her palms with masking tape. Be sure to tape them well so that all opposability between the thumb and fingers is lost.



Have the students perform various tasks:

- | | |
|------------------|-------------------------------|
| writing | zipping |
| tying shoes | peeling bananas/oranges |
| carrying objects | using a hammer or screwdriver |
| shelling peanuts | cutting with scissors |
| buttoning | |

As a conclusion for the "thumbless activity," conduct a discussion on the importance of the opposable thumb to humans. How might life be different today if people had no thumbs?

3. STRANDED ON COCONUT ISLAND

Ask the class to imagine the following scenario:

You are all on a pleasure cruise somewhere in the Caribbean. Suddenly a storm comes up, driving your ship off course and wrecking it on a small deserted island. No one knows how long you are going to be shipwrecked - it could be several days, weeks, or even months. Your major concern is food. The only things on the island to eat are coconuts from the many coconut trees. The supply is unlimited.



YOUR PROBLEM IS: How do you get the meat and juice out of the nut? You have no tools, and all the wreckage from your boat has washed away with the tides.

Break the class into groups of 4 or 5. Give each group a real coconut (optional) and tell them to think of as many ways as they can to get the meat out of the coconut. One person from each group should be the recorder.

4. THE LAST WISH OF THE FISH

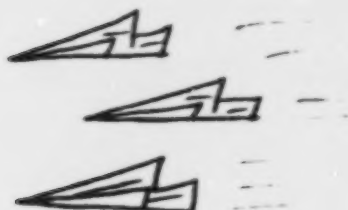
Put a goldfish (or other fish) in a gallon glass jar with a lid. The lid should have at least one hole in it. As a demonstration, turn the jar upside down, allowing the water to slowly run out into a pan. While the water is running out, talk about what might happen to the fish if the present conditions continue. Ask the class to think about what kinds of changes the fish would have to undergo in order to live with no water (a kind of accelerated evolution - gills to lungs).



Compare the students' ideas on how the fish might change in order to survive with the actual theory of evolution that scientists believe occurred (i.e., fish to amphibians to reptiles). The teacher might also want to discuss the lungfish, a fish that can survive for long periods of time out of water. Tarpon and catfish are two local fish with primitive lungs that enable them to breathe air directly from the atmosphere when oxygen in the water gets scarce.

5. PLANE FACTS

Pass out a paper towel and a piece of wax paper of the same size to each student. Instruct the class to make two identical airplanes using the paper towel and wax paper.



Take the class outside and allow students to test their planes.

After the test flights, have them line up their planes on the ground. Take a watering can and

sprinkle all of the planes with water. Now let students fly their planes again. Which plane is better able to fly in wet weather?

Discuss the results of the airplane experiment. Hopefully, the wax paper airplanes outlasted the paper towel ones. Why? Compare the wax on the paper to the oil on the feathers of most water birds. Most water birds have oil on their feathers to repel water. This prevents the bird's feathers from soaking up too much water and weighing the bird down when it tries to fly.

6. HOW DOES IT DO IT?

Collect, or have the students collect, pictures from magazines of the following: different kinds of birds, crabs, snakes, mammals, fish, or any other animal.

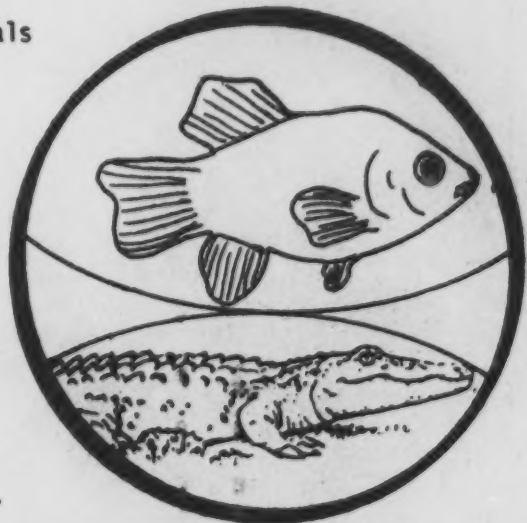
Have small groups pick out a picture and write about how the animal makes its living. What does it eat? How does it get its food? How does it move? Where does it live? What is it about the animal that enables it to live there? Tell the students to list either physical structures (gills, fins, etc.) or behaviors (sneaks up on prey, hunts only at night, etc.) to answer the questions.

Allow each group the opportunity to share its discoveries with the rest of the class. The sharing could be in the form of a discussion, display, demonstration, or even by creative dramatics.

7. CONVERGENT CRITTERS

Each student is to pick any two animals that are very different but have similar behaviors - swimming, flying, walking, crawling, eating the same food, etc. Have the students write about how each pair of animals is able to perform a similar function, yet with different physical features.

Examples: Compare the way an alligator swims with the way a fish swims; compare the way a sea otter catches, opens, and eats

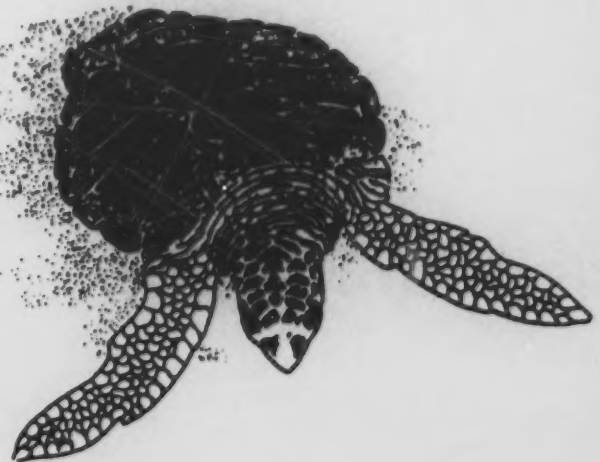
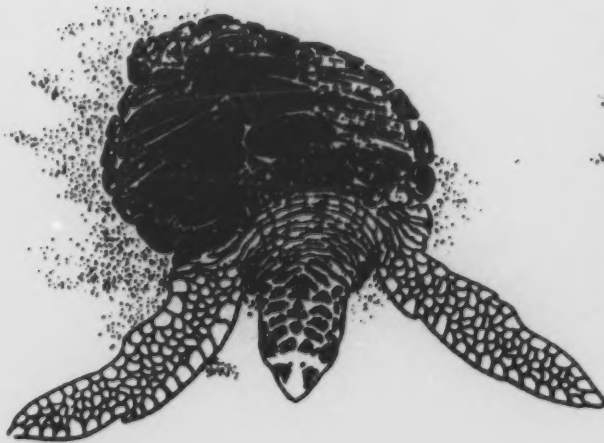


abalones with the way people do, or the way a starfish might.

8. ADAPTATION

After the students are given an opportunity to share their writings, a discussion should follow that relates their work to an understandable definition of adaptation. This should be the first time that the term adaptation is defined. The teacher should discuss with the class all of the previous activities and relate their meanings with the term adaptation. An adaptation is a structural or behavioral characteristic of an organism or human structure that enables it to survive. Adaptation can also be thought of as the process of acquiring a structural or behavioral characteristic that enables an organism to survive in a changing or changed environment.

Brainstorm all the adaptations the class can mention. Be sure they include some human adaptations. Write them on the chalkboard. Go back and classify the adaptations as either structural or behavioral.



Teaching & Learning... information

Section 2

The activities in this section should focus on what the student needs to know in order to understand the concepts in the unit. The student should acquire information from the teacher, films, supplemental readings, the library, or experts, etc. in order to develop a foundation of knowledge basic to understanding the instructional concepts.

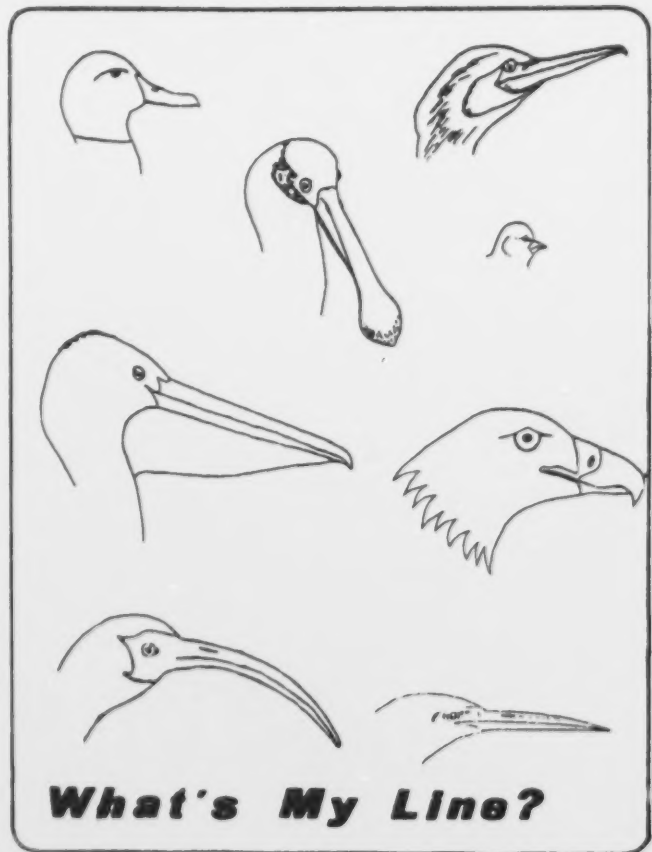
1. WHAT'S MY LINE?

The "Student Classbook" contains a full page version of the "What's My Line?" illustration.

Ask the students to draw the rest of the body picture, the food the bird would eat, and the habitat in which they think the bird would live.

Tell them to make their drawings as specific in detail as they can. Artistic ability will not be judged. Permit them to use pencil, crayon, ink, pastels, paint, etc. to

complete the drawings. Each student should pick at least two birds to draw.



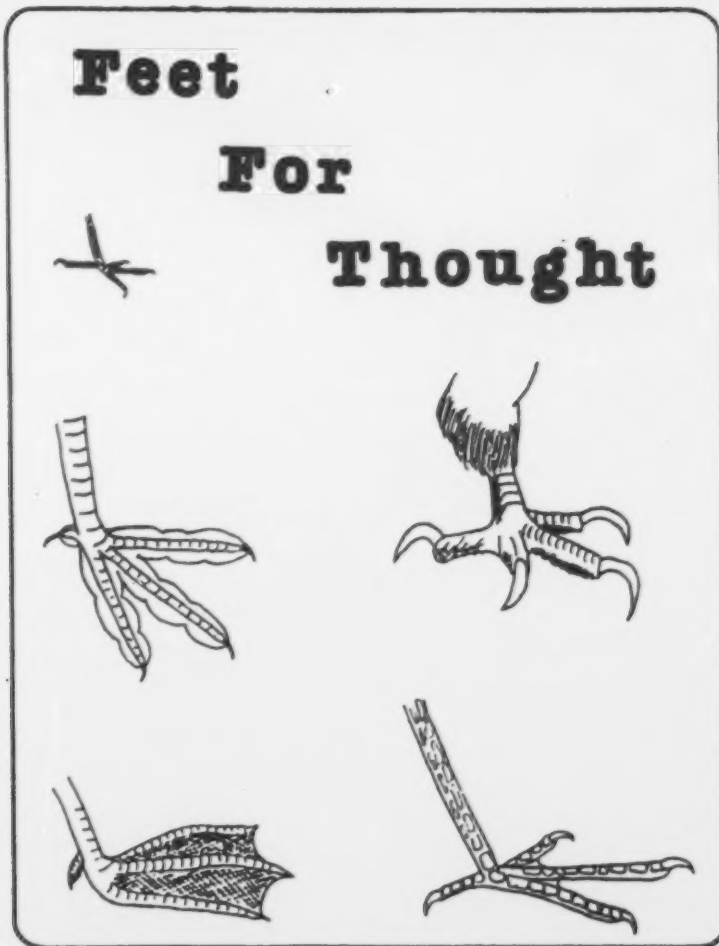
If permitted to take drawings home to finish, students may be more willing to risk their artistic egos and devote more effort. The pictures should be displayed around the room with time allowed for all students to examine them. What were the most common habitats or foods for any one species?

Discuss with the class the actual uses of each bill. It should be explained that the birds hunt for food in different ways. If all birds ate the same kind of food, that food source would soon run out and the birds themselves would die out. The fact that each bird has adapted to finding different food and catching food differently enables many different kinds of bird species to live in one area. The field trip site is the winter home of thousands of birds representing many species. Each species obtains its food in a manner that is unique.



2. FEET FOR THOUGHT

Do the same activities with bird feet. Explain how each foot has adapted specifically to fit the feeding habits of each kind of bird.





3. "DING" DARLING: CARTOONIST AND CONSERVATIONIST

The "Student Classbook" contains a brief biography of J. N. "Ding" Darling, which the students should read. Following the biography are two political cartoons which each student should study and interpret. In class the students could discuss the messages each cartoon carries.

4. VOCABULARY

It is important for each student to have a sound understanding of the following terms and to know how each word relates to an overall understanding of adaptation. It is recommended that students work in small groups. They should first try to define each word without the use of a dictionary or glossary. Next they should consult a dictionary, glossary, or other books that might help them to define the words. Finally, as a class, a common definition should be made.

adaptation	structural adaptation
adapting	behavioral adaptation
habitat	environment
beak	culture
survival	foot

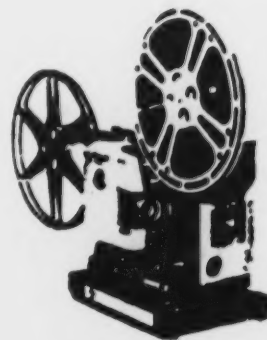
5. FILMS

This is a good time, right before the field trip, to show any films the teacher feels might be useful.

The Media Center has many films on local birds and bird adaptations.

The following is a list of some that have been found to relate to this unit:

PROBLEMS OF CONSERVATION	12.0421
WILD ANIMALS ADAPT	11.0782
WORLD IN A MARSH	12.0087
ADAPTATION FOR SURVIVAL	12.0378
AUDUBON'S FLORIDA WILDLIFE	12.1331
ADAPTATION IN ANIMALS	12.0129
AUDUBON'S SHORE BIRDS	12.1332
BIRDS OF A FLORIDA MARSH	12.0177



Trying It Out...

field trip

Section 3

The activities in this section establish the required information procedures, rules, and student work assignments for the community study field trip. The primary purpose of this section includes firsthand field trip experiences and activities for students to try out in a real world situation the information they have acquired.

The J. N. "Ding" Darling National Wildlife Refuge on Sanibel Island is one of the premier winter birding sites in North America. It is fortunate indeed to be able to introduce students to this special resource.

The trip will offer students an excellent opportunity to directly observe the structural bird adaptations studied in the previous section, and to correlate those structures with behavior, habitat, and food preferences. The full length of the Wildlife Drive on the refuge will be traveled. Parts of the tour will be on foot; however, for most of the distance, students will ride on the bus. The EE field



leader will provide the necessary orientation to the study site as well as to the "Student Fieldbook." Once started, small groups of students usually work relatively independent of the leader's intervention. The "Student Fieldbook" has been designed to be largely self-instructing. The primary role of the EE field leaders will be to answer questions, to stimulate discriminating observations, and to assure that students stay within established boundaries.

The drive is located on an earth-fill dike so students can only stray ahead or behind. The bus will be used to mark the forward boundary of work.

Lunch will be eaten near the observation tower on the Wildlife Drive. There are no restroom facilities on the drive. Please be sure the students use the restrooms before leaving school. Be attentive to the weather and dress appropriately. It can get rather windy and cool, especially on overcast days.



FIELD TRIP LEADERSHIP RESPONSIBILITIES

The EE/IDS field leader will:

1. provide bus transportation;
2. provide cooler for lunches;
3. provide "Student Fieldbooks," clipboards, and a limited number of binoculars;
4. inform students of expected behavior;
5. instruct students in the use of the "Fieldbook";
6. circulate among students to answer questions and point out important sightings.

The classroom teacher will:

1. pre-test students;
2. implement pre-trip materials;
3. secure parent permission slips;
4. arrange for lunches and ice;
5. help maintain proper behavior;
6. help answer questions on trip;
7. coordinate lunch distribution;
8. implement post-trip materials;
9. post-test students.



Self Teaching & Extending

Section 4

The activities in this section should encourage students to self discover "new connections" that integrate their experiences with new applications related to the instructional concepts. Students are encouraged to teach others what they know, or to create new ways of expressing or applying what they have learned.

The class has learned about adaptation through activities, reports, lectures, films, and direct observation. This unit section provides opportunities for the students to apply and extend what they have learned in new ways and to teach what they have learned to someone else.

1. INSECT SPECIALTIES

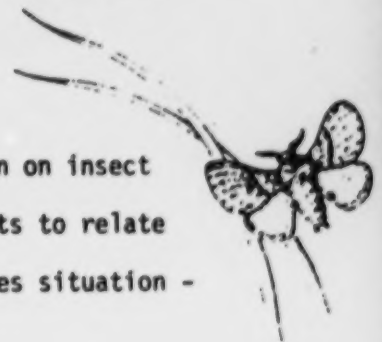
In the "Adaptation - Student Classbook" is a section on insect adaptations. It provides an opportunity for students to relate the adaptation concepts they learned to a new species situation - insects.

2. INVENT-A-BIRD

Ask the students to imagine certain situations and design in a picture or 3-D model a new bird species that could survive.

Some possibilities:

- A bird that would eat indoor cockroaches. (Among other things it would have to be quiet, be able to get into and out of buildings, and see in the dark.)





-- A bird that can digest discarded newspapers.

-- A bird that can drink the liquid left in discarded soda cans.

-- A bird that can eat the dust in the upper atmosphere.

-- A bird that eats only the filling in oreo cookies.

-- A bird that picks fleas off dogs.

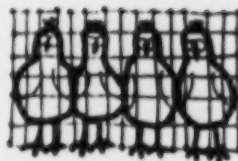


-- A bird that cleans the bathtub ring.

-- A bird that eats crumbs out of shag carpeting.



Be sure to consider structure and behavioral adaptations that the bird would need. Draw a picture or create a model of the new species.



3. OVER-SPECIALIZATION

If a creature becomes so specifically adapted that it eats only one thing, or can survive only under very limited conditions, it has a good chance of becoming extinct in a changing environment. The peril of the Everglade kite and the extinction of the dinosaurs are good examples.

Have your students research an animal of interest to find out if it has over-specialized adaptations that have caused it to become endangered or extinct.

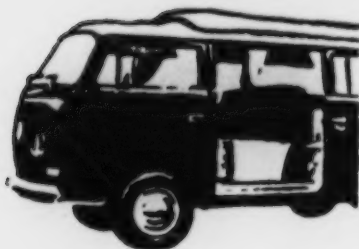
Examples: Everglade kite wood stork
 red-cockaded woodpecker sea turtles
 manatee Florida panther

Let each student report his/her findings to the class any way he/she wishes.

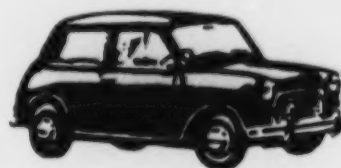
4. HUMAN ADAPTATIONS

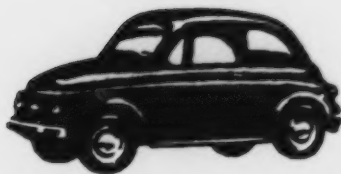
Plants and animals adapt or change over time to become better suited to living in a particular habitat. Each form has a special function. In the human-designed environment we can observe many adaptations in human-created things. Ask students to list and illustrate (drawings, cut-outs, collages) as many human-designed adaptations as they can.

Consider adaptations in transportation:



police car
taxi
fire truck
V.W. Beetle
racing car





motorcycle
private plane
jetliner
fighter plane



airport service vehicles

OR adaptations in clothing:

winter
summer
western
formal
informal
uniforms
hats
shoes
sports
fashion



OR adaptations in commerce:

check-out systems in stores
general store
department store
shopping mall
drive-in
farmers' market
supermarket
convenience store
downtown
suburban



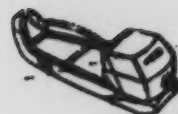
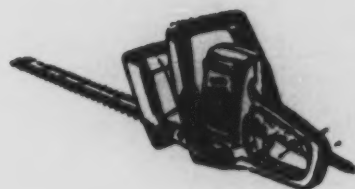
arrangements of goods in stores

food packaging

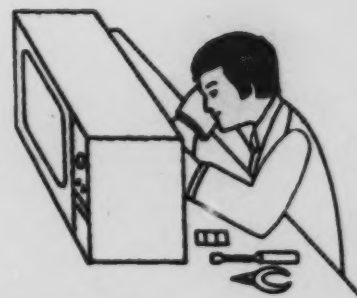
shoplifting prevention

architectural design

OR tools:



OR jobs:



How do the forms of these adaptations reflect their functions?

How well do these functions serve current societal needs? What processes or conditions might lead to further adaptations?

5. ADAPTATION ARTISTRY

Discuss with students the various adaptations of birds they observed on the field trip or brainstorm a list of characteristics, name the birds with such characteristics, and describe the advantage of the adaptation represented by the characteristic.

Have each student design his/her own original bird choosing a) where the bird will live, b) what it will eat, c) how it moves, and d) its sex. Students should each write down the characteristics they choose for their birds, then create a picture or model of it. They should also write a short report which tells about the bird, its habitat, and its adaptations.

This activity is taken from Project WILD, the secondary guide (p. 91).

6. POST TESTING

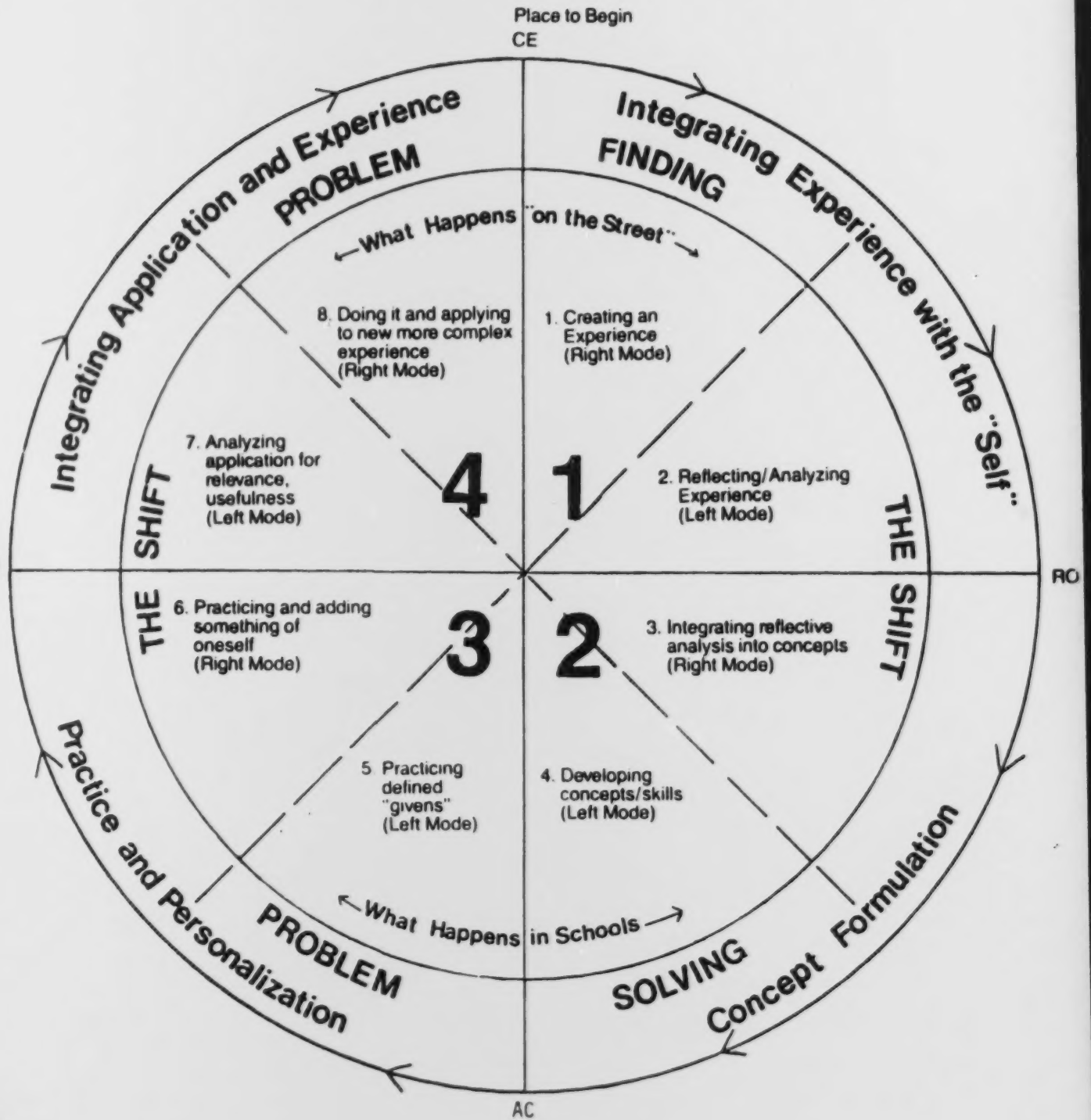
Administer the Cognitive Test (p. 34) on a post basis for comparison with the pre-test results. Use the Self Evaluation (p. 38) to help students and teachers gain insight into the affective impacts of the unit.



APPENDIX

The Complete 4MAT System Model

© EXCEL, INC. 1979
All Rights Reserved



The Teacher's Role: A Recapitulation

The teacher's role changes as s/he moves through the cycle of learning:

- from Motivator/Witness
- to Teacher/Information Giver
- to Facilitator/Coach
- to Evaluator/Remediator and Resource.



4MAT SYSTEM MODEL
FOR
ADAPTATION COMMUNITY STUDY UNIT

Place to Begin
CE



6th GRADE - ADAPTATION
COGNITIVE PRE/POST TEST

Read each statement and select the best answer.

1. An adaptation is
 - a] a special kind of wing.
 - b] the way a bird moves its neck.
 - c] something that helps an animal live.
 - d] all of the above.
2. Conservation is
 - a] the fast use of energy.
 - b] solar energy.
 - c] the wise use of natural resources.
 - d] never giving anything away.
3. A bird with webbed feet is probably best at
 - a] jumping.
 - b] swimming.
 - c] perching.
 - d] walking.
4. A spoonbill uses its bill to
 - a] spear fish.
 - b] chew fresh meat.
 - c] filter small animals from the mud.
 - d] crack open oysters.
5. An example of a behavioral adaptation is
 - A] hunting at night
 - B] flat, rounded bills
 - C] long neck and legs
 - D] webbed feet
6. An example of a structural adaptation is
 - A] filtering food from the mud
 - B] a spear-like bill
 - C] boring into trees
 - D] eating dead animals

7. A habitat is
 - a] an aviary.
 - b] the type of area in which an organism prefers to live.
 - c] a specific type of animal.
 - d] a special habit an animal has.
8. The environment is
 - a] all of an individual's surroundings.
 - b] always clean and healthy.
 - c] found only in parks.
 - d] rapidly disappearing.
9. A short, thick bill is probably used for
 - a] catching fish.
 - b] swimming underwater.
 - c] spearing insects.
 - d] crushing seeds.
10. "Ding" Darling was
 - a] an actor.
 - b] a religious leader.
 - c] a cartoonist.
 - d] a Florida "cracker."
11. A human structural adaptation is
 - a] webbed toes.
 - b] opposable thumbs.
 - c] eating many kinds of foods.
 - d] wearing clothes.
12. A human behavioral adaptation is
 - a] the automobile.
 - b] filter feeding.
 - c] eating with a fork.
 - d] long hair.
13. One way people adapt (change) the environment is by
 - a] clearing land.
 - b] moving to a warmer climate.
 - c] staying away from hurricane zones.
 - d] building outside of the flood zone.

14. One way people have adapted to the environment is by
- a] draining swamps.
 - b] not building in the mangrove forest.
 - c] spraying for mosquitoes.
 - d] cutting down noxious weeds.
15. "Ding" Darling tried to
- a] stop all hunting.
 - b] allow hunting inside refuges.
 - c] keep hunters away from birds.
 - d] improve conditions for hunting.
16. The great blue heron is a bird with
- a] legs adapted for wading.
 - b] wings adapted for swimming.
 - c] a bill adapted for crushing seeds.
 - d] eyes adapted for night vision.
17. A cockroach can hide in small places because it has
- a] a flat body.
 - b] a soft body like a worm.
 - c] the ability to change its shape at will.
 - d] special joints in its antennae.
18. Which of the following are all adaptations used for swimming?
- a] gills, fins, ears
 - b] scales, legs, tail
 - c] feet, antennae, gills
 - d] fins, feet, tail
19. Which of the following birds is a swimmer?
- a] great blue heron
 - b] cardinal
 - c] anhinga
 - d] black skimmer
20. Which of the following is considered an endangered species?
- a] osprey
 - b] cormorant
 - c] American coot
 - d] brown pelican

ADAPTATION

COMMUNITY STUDIES UNIT, GRADE 6

PRE/POST COGNITIVE TEST ANSWER KEY

<u>ITEM</u>	<u>ANSWER</u>	<u>ITEM</u>	<u>ANSWER</u>
1.	d	11.	b
2.	c	12.	c
3.	b	13.	a
4.	c	14.	b
5.	a	15.	d
6.	b	16.	a
7.	b	17.	a
8.	a	18.	d
9.	d	19.	c
10.	c	20.	d

SELF EVALUATION

ADAPTATION

WHAT I KNOW, FEEL, AND BELIEVE ABOUT WHAT I HAVE LEARNED.

How has this unit on adaptations helped me understand myself better?

How has this unit on adaptations helped me relate to other people?

How has this unit on adaptations helped me relate to my environment?

What alternatives have we explored in the way adaptations work?

What can I do with what I have learned?

How has this unit on adaptations helped me relate to the planet as a whole?

GLOSSARY

adaptations - changes that have been made which help an organism survive in its environment.

adapting - changing to fit the environment better.

behavioral adaptation - a special way in which an organism acts that helps it survive.

conservation - the wise use of natural resources.

environment - all of an individual's surroundings, including living and non-living factors.

habitat - the type of area in which a plant or animal lives, and can find all of the things it needs to survive.

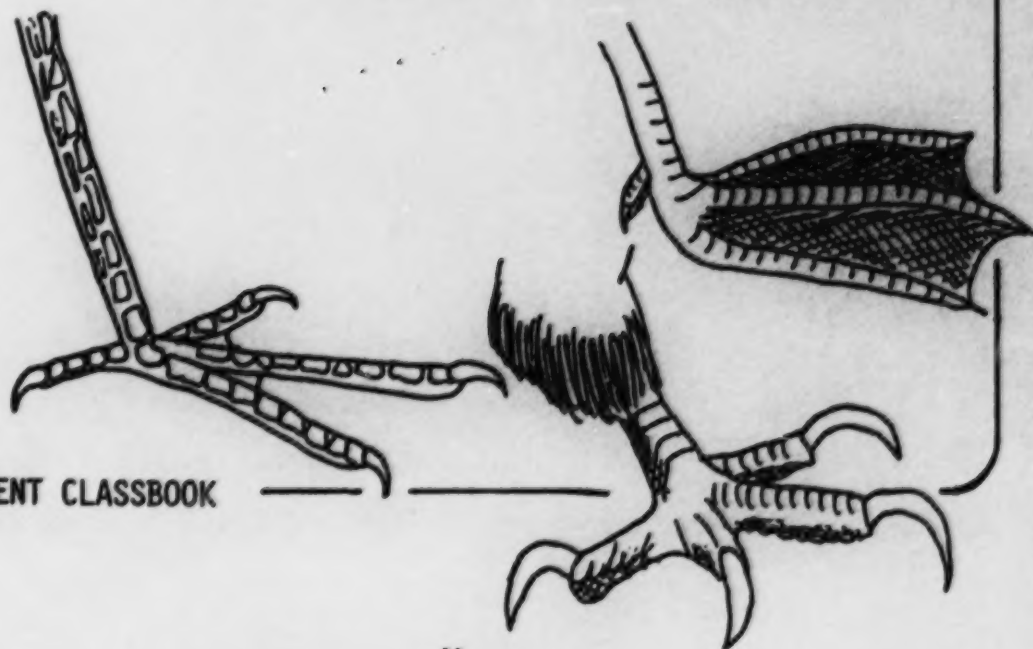
human-designed environment - that part of an individual's surroundings which has been produced or modified by man.

natural vegetation - the plants that would be found growing in an area without any human intervention.

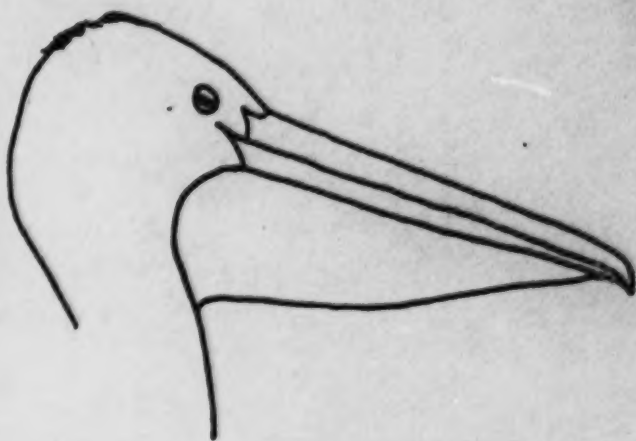
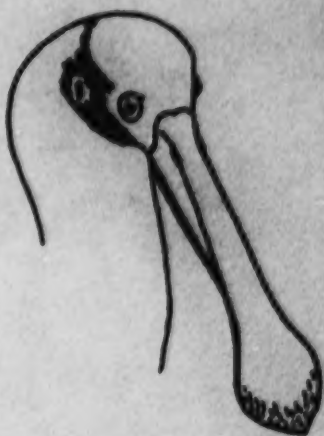
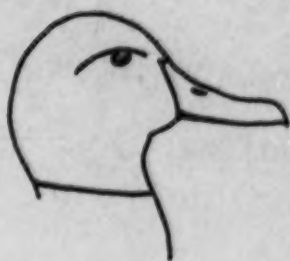
structural adaption - a physical characteristic which an animal has that helps it survive.



ADAPTATION



STUDENT CLASSBOOK

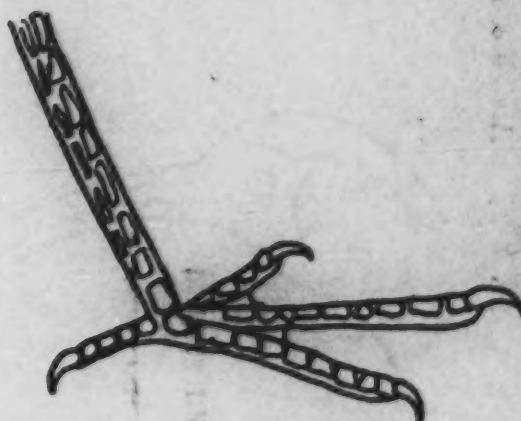
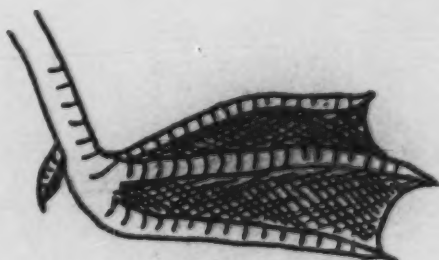


What's my line?

FEET

FOR

THOUGHT

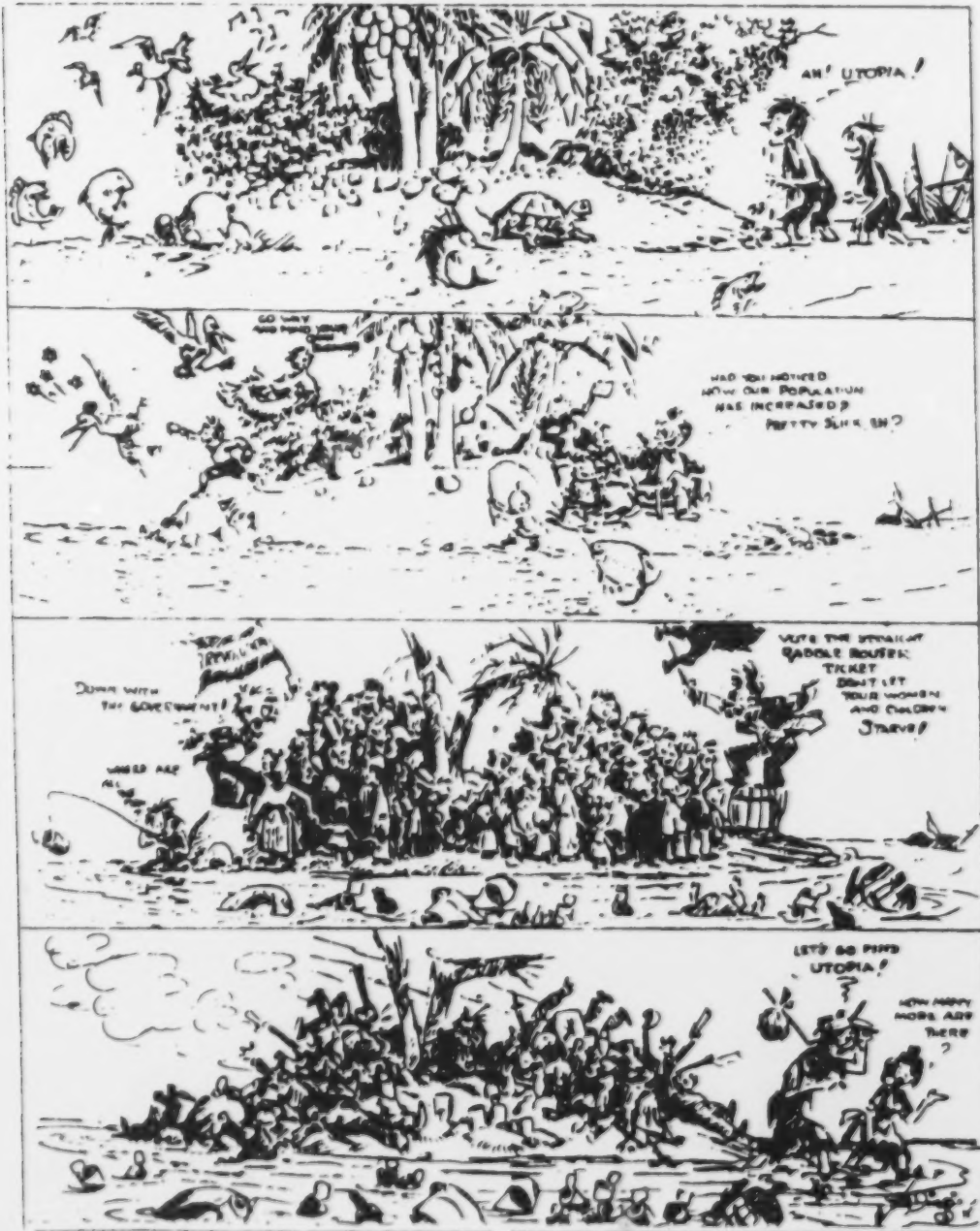


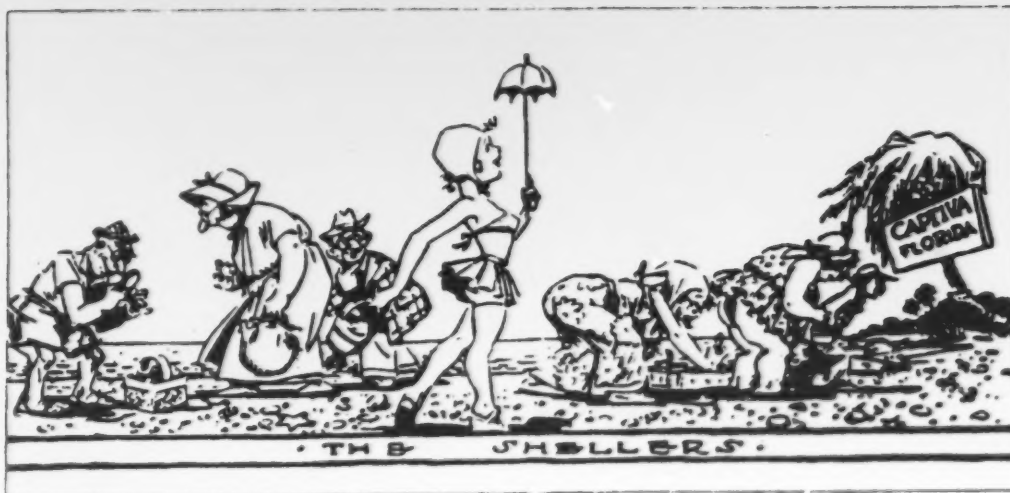


"DING" DARLING: CARTOONIST AND CONSERVATIONIST

Jay Norwood "Ding" Darling (1877-1962), cartoonist and conservationist, was born in Norwood, Michigan. He attended college in Wisconsin and South Dakota, after which he went to work for the Sioux City Iowa Journal. He soon became a cartoonist for the Des Moines Register. As he rose to the top rank among political cartoonists his work was syndicated to 130 daily newspapers, including the New York Herald Tribune.

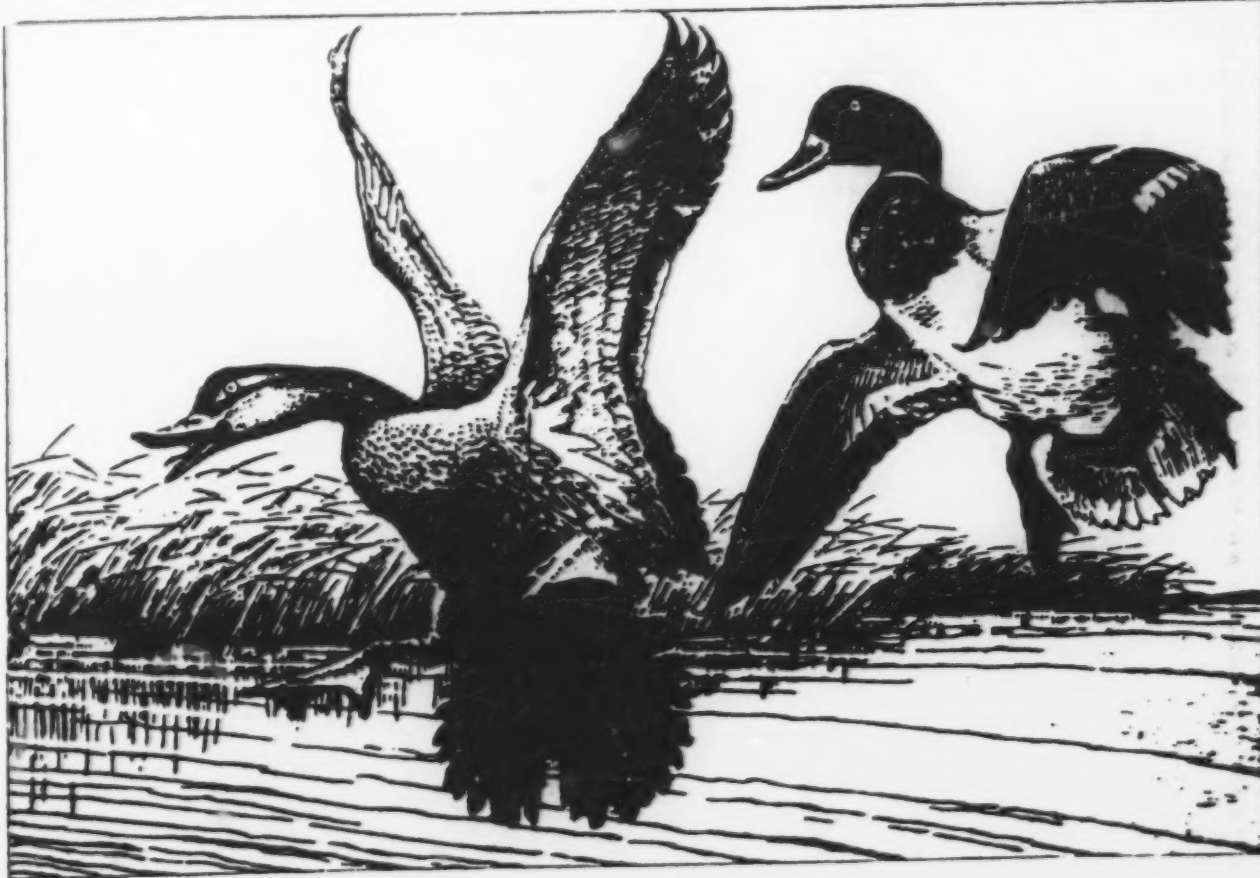
He reached an audience of many millions all over the country with cartoons noted for their wit and political satire. He was awarded Pulitzer prizes in 1923 and 1942, and in 1934 was named the best cartoonist by the country's leading editors. He signed his cartoons with the nickname "Ding."





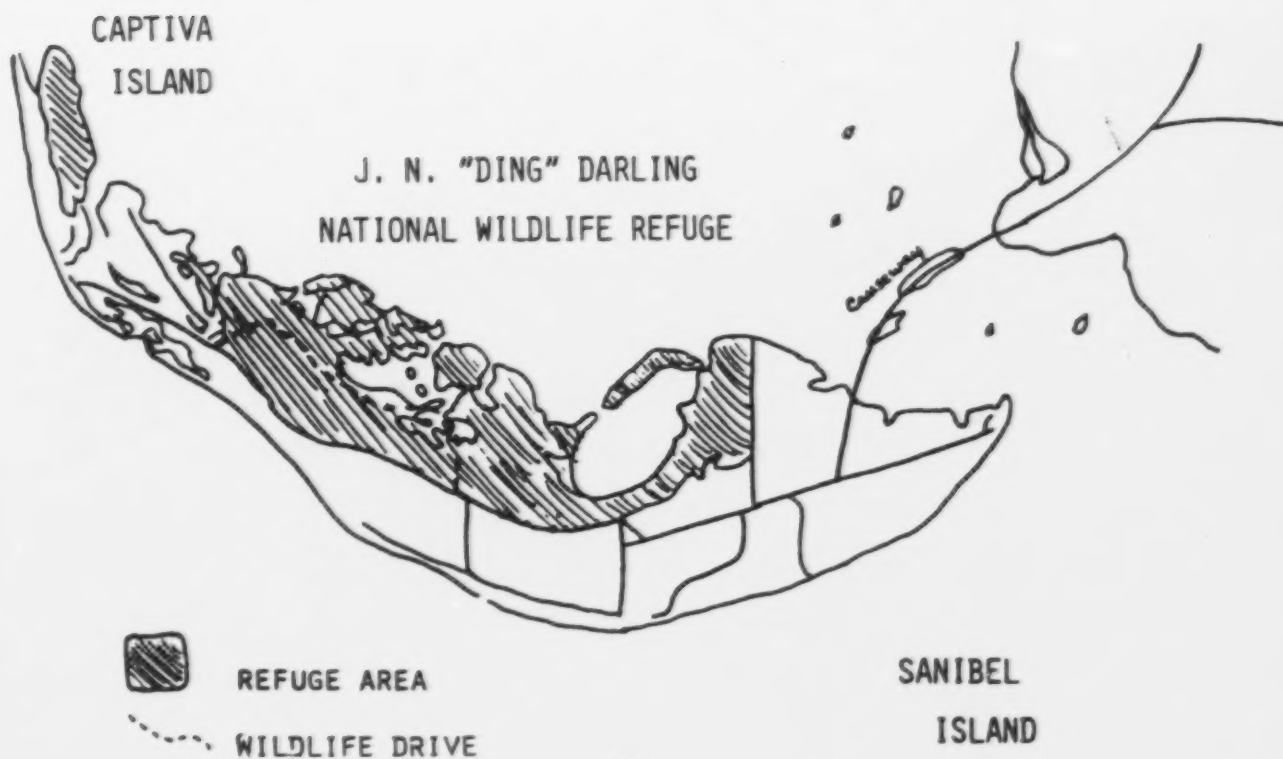
Besides politics, Mr. Darling had another great love in which he was well ahead of his time. That was conservation. Long before others had joined the call, Mr. Darling was concerned about the extinction of wildlife, air and water pollution, and other threats to the environment. These themes were often worked into his cartoons, and in July of 1934 President Franklin Roosevelt asked him to head the U.S. Biological Survey, which later became the present U.S. Fish and Wildlife Service. In this capacity, Darling battled with fervor for greater national attention and expenditures for wildlife conservation. His memos and letters to President Roosevelt were forceful, witty, and often illustrated with pointed cartoons. He had many a lusty argument with Secretary of the Interior Ickes who, in his diary, described Darling as "one of the greatest enthusiasts I have ever known." With this enthusiasm, Mr. Darling was largely responsible for securing from the Administration and Congress some \$17 million for wildlife restoration. He established the migratory bird conservation commission and made great strides toward bringing hunter and conservationist together, pioneering leadership in the field of proper game management.

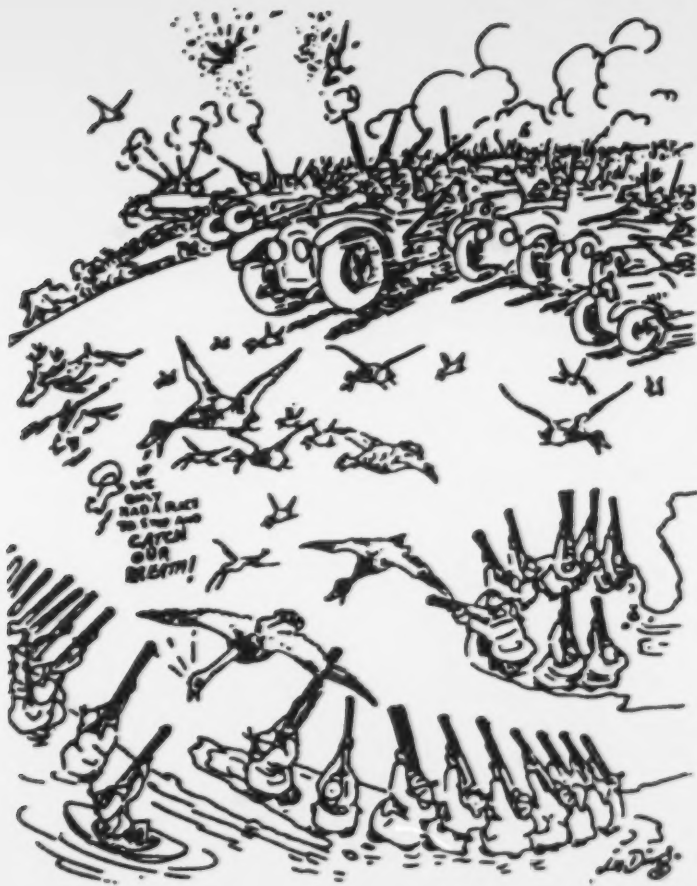
He drew the first federal duck stamp and was largely responsible for the establishment of the network of game refuges in the country today. He was called "the best friend the ducks ever had." He liked to remind overzealous developers that ducks can't lay eggs on a picket fence.



For many years Mr. Darling had a winter home on Captiva Island where he worked to bring about the principles he was recommending for the nation.

He helped to secure land and to establish on Sanibel Island what is known as the Bailey Tract of the J. N. "Ding" Darling National Wildlife Refuge. Before his death, the Bailey Tract was purchased by U. S. Fish and Wildlife Service and, after he died, a group of his island neighbors formed the "Ding" Darling Committee. Through the efforts of that committee, the large refuge tract which bears his name was acquired by the Federal Government and the Sanibel National Wildlife Refuge was renamed in his honor. The land was turned over to the Fish and Wildlife Service by the State of Florida and the memorial committee became the Sanibel-Captiva Conservation Foundation. The J. N. "Ding" Darling Foundation was established in Des Moines to carry on other aspects of his conservation ideals.





WHAT IS THIS CARTOON
TRYING TO SAY?

Eventually, Why Not Now?



WHAT IS THIS CARTOON TRYING TO SAY?

INSECT SPECIALTIES



Work in groups of four. Each of your groups should make a simple live insect collection over the weekend or after school. Each group collection should include: grasshopper, roach, butterfly or moth.

If possible, put each animal in a small baby food jar. We will let all of the animals go after a day or two. Make sure that you have a small nail hole in the jar top, so that air can enter.



Once you have your collection, answer the questions about the insects' adaptations. Let's start by studying the roach in your collection.

1. Is the roach's body fat and rounded, or it is flat and wide?

2. Are the legs smooth, or do they have small spines on them?

3. Are the antennae short, or are they about as long or longer than the roach's body?

4. Are the eyes large or small?

Now let's see how these adaptations help the roach survive. First of all, roaches are usually found underneath the bark of old trees or living under logs and piles of dead leaves.

5. How does the flat body of the roach help it survive?

6. What do you think the spines on the roach's legs help it to do?

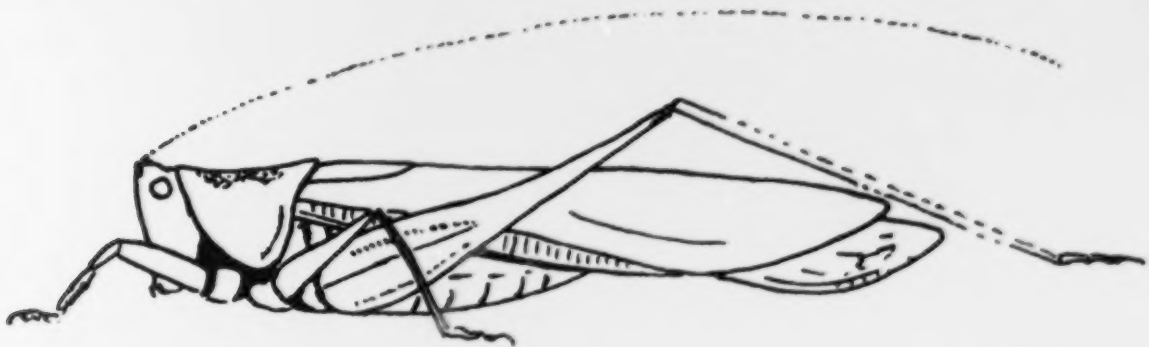
(Remember where roaches live.)

Antennae on an insect help the insect find his way around. The antennae "feel" around for food as well as warning the insect of his enemies.

Look at your answers to questions #3 and #4 in this section.

7. When do you think the roach feeds: in the daytime, or at night?

Since they have small eyes, and large antennae, roaches usually feed at night. The spiny legs help to hold the animal from falling as it climbs around on the bark and leaf piles. Its flat body allows it to crawl into small narrow spaces.



Now let's examine the grasshopper.

Look at the eyes and antennae first.

8. Why do you think this animal feeds during the daylight hours?

Look at the large hind legs of the grasshopper. These legs are adapted for jumping. These legs can push the animal from one area to another. Now look at the animal's front legs.

9. Do the bottoms of the front pair of legs point forward, or do they point backwards? _____

10. Try to guess why the direction in which the front legs point is an important adaptation for a grasshopper. _____

To show yourself why this is important, imagine that you are sliding headfirst down a sliding board.

11. Would it be easier to stop sliding if you put your hands out in front of you, or behind you? _____

You can see that when a grasshopper jumps from one leaf to another, it must be able to stop fast. If it couldn't stop, it would slide off the new grass blade.

Now look even closer at the legs.

12. Are they smooth, or covered with spines? _____

13. How do you think these spines help the grasshopper as it moves around on the plants? _____





Now examine the butterfly or moth. These animals feed on nectar found in flowers.

14. How do the animal's wings help it survive? _____

The wings can help the animal escape from its enemies, but just as important, the wings carry the butterfly to new flowers. Was your answer to question #14 similar to what you just read? _____

Hold the animal very carefully. Take the point of your pencil and very gently run the pencil point across the bottom of the animal's head.

15. Did you see a coiled tube extend from the butterfly's head?

If you didn't, try again.

This tube is a special adaptation used for feeding. Nectar is a liquid, and the tube is like a long coiled straw. The butterfly sucks nectar from the flower into its mouth.

If you brought in any other insects, try to figure out how their adaptations help them to survive. Look for wings, jumping legs, large eyes, antennae, spines on their legs, special mouth parts, and their body shape. When you put your observations and facts about where the

animal lives together, you should be able to explain how some of the body parts aid in survival.



ADAPTATION



**HOW TO MAKE IT
IN A BIRD'S WORLD!**

Grade 6

Community Study Guide
Lee County Schools
2055 Central Avenue
Fort Myers, Florida 33901
(61)

12/85

55

FAST-FINDER GUIDE

INTRODUCTION.	2
Bill Shapes	3
Foot Shapes	3
Section A: Herons and Egrets	4
Section B: Ibis/Woodstork/Spoonbill.	9
Section C: Ducks	11
Section D: Mergansers.	16
Section E: Coots and Moorhens.	17
Section F: Other Birds	20
Dare to Compare	27
Who Eats What?.	28
Review.	29

Adaptation: How To Make It In A Bird's World

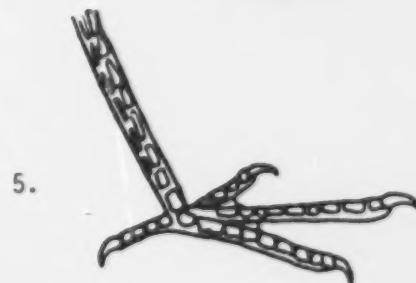
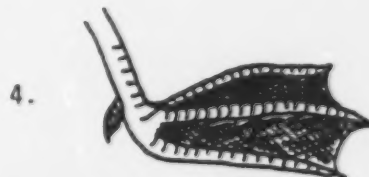
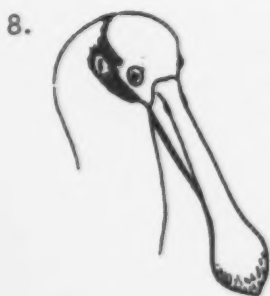
This student fieldbook will guide you while you are at the field site observing many different kinds of birds. This book is divided into sections according to the particular adaptations of different types of birds. When you see a bird, identify it by the pictures in this book. Then, answer the questions in the section where you found that bird's picture. You will find it helpful to sit and watch the bird for several minutes before answering any questions. Look carefully at its physical characteristics and watch what the bird is doing. Watch how it moves, how and what it eats, and how it interacts with other birds. Use your binoculars for more detailed observations!

Following the questions, you will find a grid in which you should record bill, foot, and leg shape and color; bird size; and what the bird eats. Fill in the grid as accurately as you can. Record what you see, not what you think you should see. Use the keys to bill and foot shape on the following page. Write in the actual colors and record leg shape as S = short or L = long. •

KEY TO:

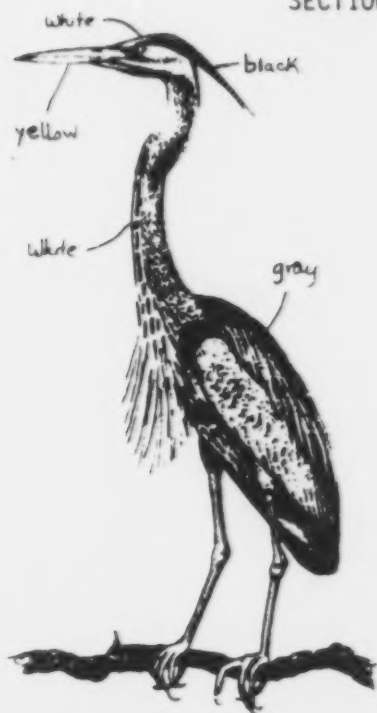
Bill Shapes

Foot Shapes

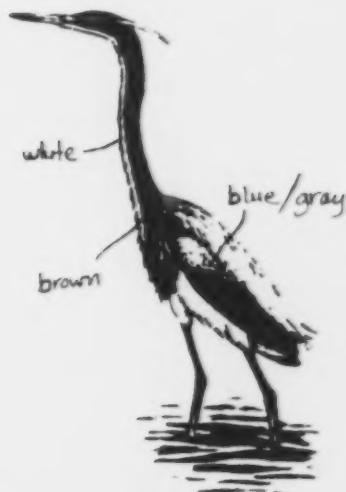


Bills and Feet
3
(65)

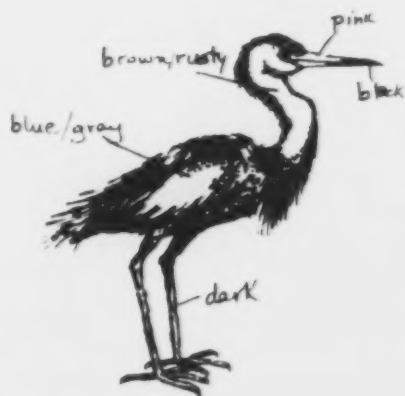
SECTION A - HERONS AND EGRETS



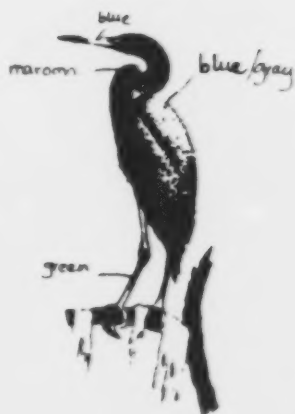
Great Blue Heron



Tricolored Heron



Reddish Egret



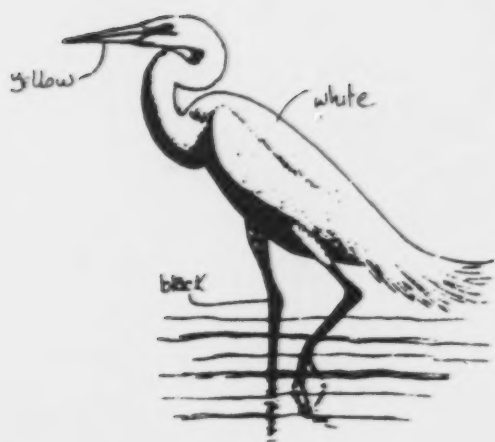
Little Blue Heron



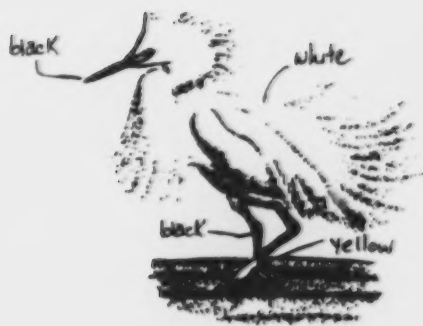
Yellow-crowned
night Heron

Herons and Egrets

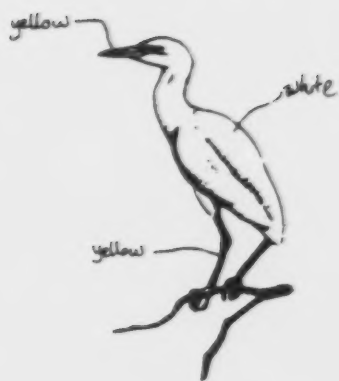
MORE HERONS AND EGRETS



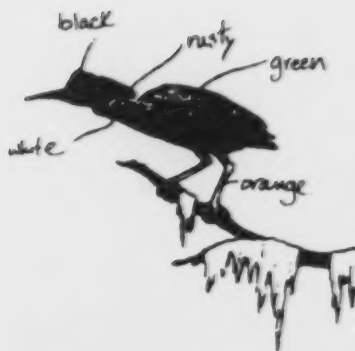
Great Egret



Snowy Egret



Cattle Egret



Green-backed Heron

Herons and Egrets

5
(67)

SECTION A - Questions about the Wading Birds

1. Which bird are you observing? _____
2. Is the bird swimming or wading? _____
3. Are the bird's legs as long or longer than its body, or are its legs shorter than its body? _____
4. Is the bird's neck long, or is the neck short? _____
5. If you were a bird, do you think it would be easier to see a wide area of water with short legs and a short neck, or would it be easier to see down into the water if you had a long neck and long legs? _____
6. Is the bird's bill flat and rounded, or is it narrow and pointed? _____

7. Let's quickly review what we have observed so far about this bird; it has long legs, a long neck and a sharply pointed beak. Now the big question: what do you think the bird eats? _____

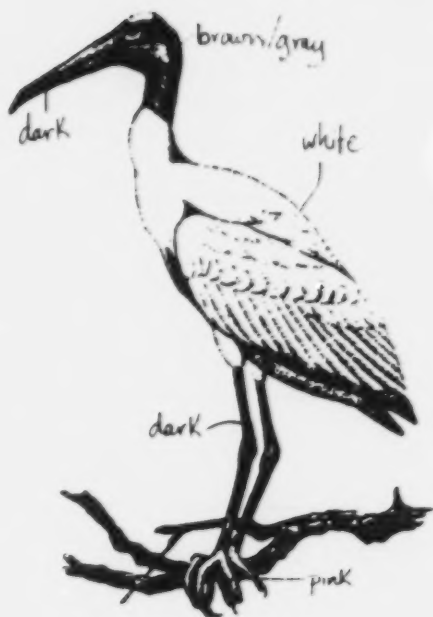
8. Now, try to explain how you think this bird is able to get this type of food. (Be specific.) _____

9. Watch your bird as it feeds; briefly describe its actions. (Does it stand still? Does it chase after food? How does it use its bill? Its neck? Does it look into the water? Does it stand in deep water? Shallow water? Along the shore?)

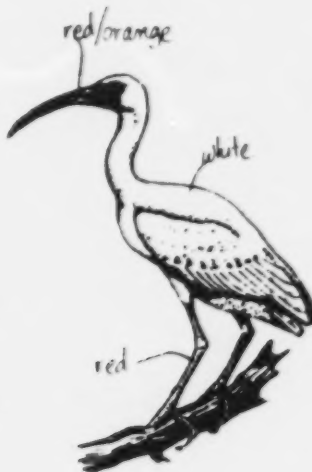
Now list your observations on these actions and as many other actions as you can observe.

	Bill Shape	Bill Color	Leg Shape	Leg Color	Foot Shape	Foot Color	Bird Size	Eats
Great Blue Heron								
Tricolored Heron								
Little Blue Heron								
Green-backed Heron								
Great Egret								
Snowy Egret								
Yellow-crowned night Heron								
Reddish Egret								
Cattle Egret								

SECTION B - Wood Stork/White Ibis/Roseate Spoonbill (more waders)



Wood Stork



White Ibis



Roseate Spoonbill

1. Which bird are you observing? _____
2. Draw a picture of the bird's bill: _____
3. Does this bird have long legs? _____
4. Does it have a long neck? _____
5. As you watch the bird, does it place its bill down in the water?

6. What does it do with its bill when it is in the water? _____

Ibis/Stork/Spoonbill

7. These wading birds like to probe in the mud or use their feet to scare food into their bills. Watch these birds and see if you can tell what they eat. _____

	Bill Shape	Bill Color	Leg Shape	Leg Color	Foot Shape	Foot Color	Bird Size	Eats
White Ibis								
Wood Stork								
Roseate Spoonbill								

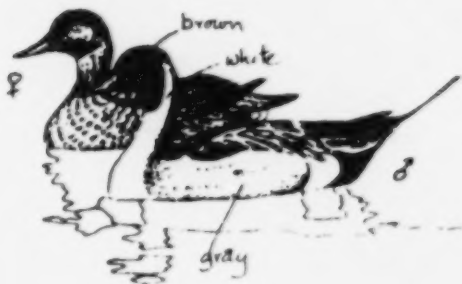
Ibis/Stork/Spoonbill

10
(72)

SECTION C - DUCKS



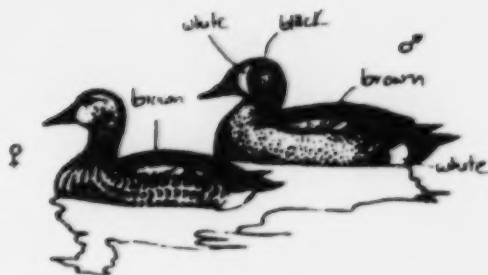
Northern Shoveller



Pintail



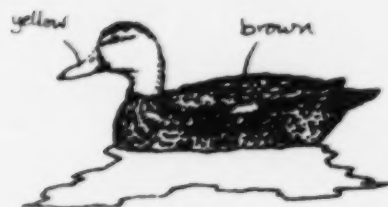
Lesser Scaup



Blue-winged Teal



American Widgeon



Mottled Duck

See page 23 for
a bird that looks
like a duck but
is not one.

SECTION C - Questions about Ducks

1. Which duck are you watching? _____
2. Are these birds swimming or wading? _____
3. Are the bird's legs shorter or longer than its body? _____

4. Is the bird's neck longer or shorter than its body? _____

5. Is the bird's bill sharp and pointed, or is it broad and flat?

6. From what you know about fish, are they easy to hold or are they slippery and hard to hold _____

7. If you could get close enough to one of these birds, you would see that the bird's bill is very smooth and that there are no teeth on its bill. In your opinion, would this bird have trouble hanging onto a fish with its bill? _____
8. If this bird is unable to catch fish, then it must be feeding on something else. What do you think the bird is eating? _____

9. Let's watch the bird's activities for a few minutes. Is the bird diving under the water, or is it simply tipping its head and front part of its body under the water? _____

10. There are two main groups of ducks. One group is called the Diving Ducks and the other group is the Surface Feeding Ducks. What type of duck are you watching? _____
11. Surface Feeding Ducks are mainly plant eaters. Diving Ducks go under the water and eat plants and sometimes snails, crabs, and shrimp. Now, where does the duck you are watching find its food: near the bottom, or near the surface of the water? _____

12. Since these birds seem to spend so much time swimming in the water, they must have some special adaptations for this type of life. Are the duck's legs nearer the front or nearer the back of its body? _____
13. When a duck is on land, does it walk with a waddling back and forth motion, or does it walk smoothly? _____

14. When the duck swims, does it seem to be moving through the water with a smooth forward motion, or does it seem to be jerking in its movement through the water? _____

15. From your observations, do you feel that the position of the duck's legs is better adapted to walking or swimming? _____

Ducks

13 63
(75)

16. A duck's feathers are covered with an oil that the animal produces.

Can you give a reason for this? _____

17. If you had trouble with question #16, try to answer this question.

It may help you understand the reason for covering the feathers with oil. If you placed a piece of waxed paper and a piece of paper towel in water, which one would soak up the most water? _____

Why did you give the answer you did? _____

18. Now, once again, why do you think the duck produces an oil to cover its feathers? _____

So far, we have observed two types of birds: the fish eating egrets and herons, and the plant eating ducks. We have observed some of the important adaptations that allow these birds to live where they do and to catch the types of foods they need to stay alive. The wide flat bill of the duck helps the animal collect water plants, while the sharp bill of the herons and egrets makes an excellent fish grabber or spear.

The long legs and neck make it easy for the herons to spot fish, while the position and shortness of the duck's legs allow it to swim well. If you were lucky enough to see the feet of these two types of birds, you probably noticed that the duck has webbed

feet which help push it through the water, and that the herons and egrets have very long, spreading toes which help them stand and walk.

<u>Diving Ducks:</u>	Bill Shape	Bill Color	Leg Shape	Leg Color	Foot Shape	Foot Color	Bird Size	Eats
Lesser Scaup								

<u>Surface Feeders:</u>								
American Widgeon								
Pintail								
Blue-winged Teal								
Green-winged Teal								
Northern Shoveller								
Mottled Duck								

SECTION D - Red-breasted Mergansers - A Duck of a Different Kind

See if you can find a merganser. A merganser is also a duck, but it is adapted to eat and move differently than the other kinds of ducks.



1. Does this bird have a bill as broad as the other ducks' bills?

2. Examine the drawing of the merganser's bill above. How is it different from other ducks' bills? _____

3. Does the merganser dive below the surface? _____

4. What do you think the merganser eats, and why do you think it eats these things? _____

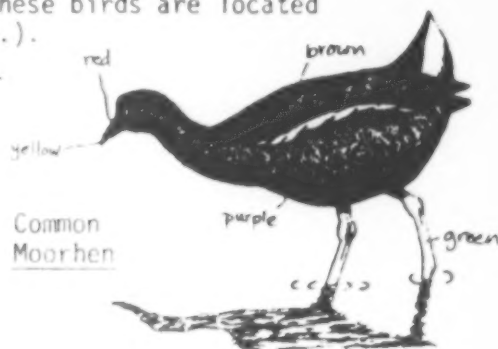
	Bill Shape	Bill Color	Leg Shape	Leg Color	Foot Shape	Foot Color	Bird Size	Eats
Merganser								

SECTION E - Coots and Moorhens

There are two other birds that you are likely to see today. Pictures of these birds are below. See if you can spot one or both of these birds. Pay particular attention to where these birds are located (close to shore, swimming in the water, etc.).



American Coot



Common Moorhen

1. How is the shape of these birds' bills different from the duck's or the heron's and egret's? _____

Draw pictures of the different bills in the space below.

Heron

Coot and Moorhen

Duck

2. The shape of the moorhen's and coot's bill is very much like that of a chicken, kind of short and cone-shaped.

This type of bill is very effective in catching insects and picking up seeds and other plant material. If you watch a moorhen closely, you might be able to see its feet. The moorhen's feet also resemble a chicken's feet but are much larger.

Do the moorhens spend more time on the shoreline or in the water?

3. The shoreline areas are usually muddy and soft. How do you think the large spreading toes of the moorhen's feet help the bird in these muddy areas? _____
-

The coot's feet are similar to a moorhen's, but the coot has lobes of skin along its toes.



Coot's foot



Moorhen's foot

4. Where do the coots seem to be spending most of their time, near the shore, or in the water? _____
-

The lobes of skin on the coot's feet help it swim. The skin lobes act very much like the web of skin between a duck's toes.

5. What is the advantage of having the lobed toes that the coot has? _____
-
6. Usually, if two types of animals feed on the same general kinds of foods, they are not found living in the same area. Both the coots and moorhens feed on insects, small water animals and plant material. Why are these animals able to live so closely together, when other animals that eat the same foods are unable to live together?

Coots/Moorhens

18
(80)

(Remember what you have learned about the feet of each bird and where you observed the birds feeding.)

Adaptations allow animals to survive in their environment. You have seen some bird adaptations today. As you look at other birds in the sanctuary, see if you can determine what they eat and what adaptations they have that allow them to survive.

	Bill Shape	Bill Color	Leg Shape	Leg Color	Foot Shape	Foot Color	Bird Size	Eats
American Coot								
Common Moorhen								

Section F - Other Birds in the Refuge

This section identifies other birds not included in the previous sections. Watch for and identify as many of these birds as you can. Complete the questions which follow the pictures. The grid of characteristics is at the end of this section. Have fun, and happy birding!



Ground Dove



Sparrow



Cardinal

1. The bill on these birds is very short and thick. These birds feed mainly on seeds and insects. In your opinion, why didn't these birds develop a longer more slender bill that could snatch up insects?

2. Did you see any of these birds feeding near the water or were they near the road area? _____

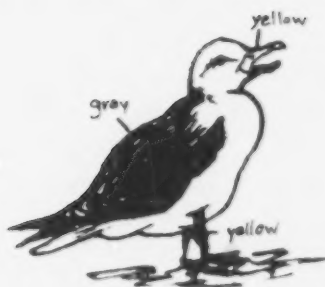
Seeds are very hard to digest, so many birds eat small stones that grind up the seeds.

3. Why do you think they feed near the road? _____

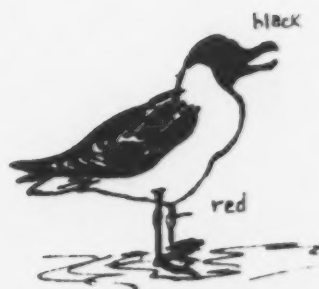
Perching Birds

20
(82)

Gulls



Ring-billed Gull



Laughing Gull

1. The gulls are sometimes scavengers but they also eat live things.
2. Watch to see how they search for and capture their food.

Fish Crow



1. Crows are omnivores. They will eat plant and animal matter.
2. How do you think this is useful to a species of bird? _____

3. Can you name other omnivores? _____

Vultures



Turkey Vulture



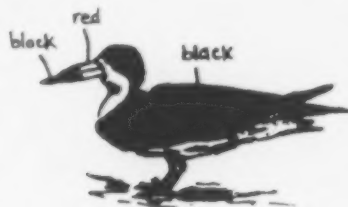
Black Vulture

Gull/Crow/Vulture
21
(83)

1. Vultures are scavengers. They eat dead animals. They are part of nature's recycling crew.
2. Draw a picture of the vulture's bill.

3. How do you think the hook on the bill helps these scavengers feed?

4. Why don't they have feathers on their heads? _____



Black Skimmer:

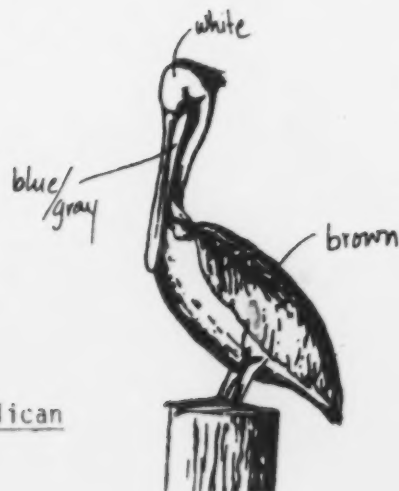
1. What part of this bird's bill is longer, the top or bottom?

2. If you were lucky enough to see the skimmer feeding, how did it use its bill? _____

3. What do you think the skimmer eats? _____



Pied-billed Grebe



Brown Pelican

Pied-billed Grebe

(Although it may look like a duck, it is not one.)

1. "Pied-billed" means having a ring around the bill, and, as you can see if you look closely enough, there is a dark colored line around this grebe's bill. What other birds have you seen today that have a similarly shaped bill? _____

2. Does the pied-billed grebe dive under the water? _____

3. What do you think grebes eat? _____

4. Why did you give this answer? _____

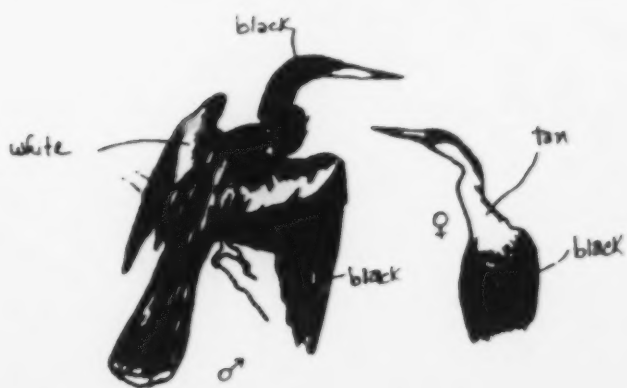
Grebes are one of the best divers of all the water birds and, in some places, people call them "water witches," because of their diving ability.

Brown Pelican

1. Draw a picture of the pelican's bill:
2. When a pelican feeds, it dives into the water with its bill open.
What is this type of bill adapted to catch? _____



1. These birds are called birds of prey because they _____
2. How do you think they catch their prey (food)? _____
3. What kinds of food do they eat? _____



American Anhinga



Doubled-crested Cormorant

Anhinga:

1. This bird is usually found in fresh water areas, and does not produce oil to cover its feathers like the ducks. Why does the anhinga hold its wings out when it sits in the trees? _____
2. From the shape of the anhinga's bill, what do you think it eats? _____

Cormorant

1. The cormorant looks very much like the anhinga, but cormorants are usually found in salt water. How is the bill of the cormorant shaped? Draw a picture of it.
2. The cormorant is another fish eater, but it does not have a spear-like bill. What part of the cormorant's bill helps it catch fish? _____

Cormorant/Anhinga

25
(87)

	Bill Shape	Bill Color	Leg Shape	Leg Color	Foot Shape	Foot Color	Bird Size	Eats
Sparrow								
Cardinal								
Ground Dove								

Ring-billed Gull								
Laughing Gull								

Turkey Vulture								
Black Vulture								
Crow								

Skimmer								
---------	--	--	--	--	--	--	--	--

Grebe								
Brown Pelican								

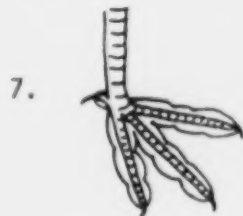
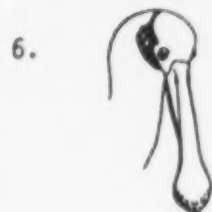
Cormorant								
Anhinga								

American Osprey								
Bald Eagle								
Red-shouldered Hawk								

DARE TO COMPARE

Beside each bird's name write the number of all the adaptations which correspond to that specific type of bird.

Bills and Feet



Bird names

answers

A. Great Blue Heron	_____
B. Roseate Spoonbill	_____
C. Blue-winged Teal	_____
D. Anhinga	_____
E. American Coot	_____
F. Pelican	_____
G. Hawk	_____

WHO EATS WHAT?

Match the type of food (in left column) with the name of the bird that would eat it.

1. Live fish

2. Shrimp

3. Aquatic plants

4. Seeds

5. Mouse/Snake

a. Great egret

b. Pintail duck

c. Woodstork

d. Cardinal

e. Osprey



Who Eats What?

28

(90)

REVIEW:

On your field trip you have seen that most birds have special adaptations or body parts that allow them to live better or catch food more easily. Answer these review questions by using the first part of the booklet.

1. Did most of the wading birds have long, or short legs?

2. Did the majority of the wading birds have long pointed bills or round flat bills? _____
3. Did the wading birds have short necks or long necks?

4. Did the wading birds have webbed feet or wide, spreading feet?

5. What do most of the wading birds eat? _____

If you examine your answers to the questions, you can see that the birds' adaptations allow them to obtain food more easily.

SCHEDULING CONSIDERATIONS

To arrange an EE/IDS community study trip, please call us at 275-3033.

Our first recommendation is to use one of the standard grade level trips. Some of these trips are best done during specific seasons, while others work well at any time. Call early in the school year to assure getting a trip, and to assure getting it at the most appropriate time.

If the standard trip does not meet your needs, a custom trip could be designed. This would necessitate a meeting with EE/IDS staff to identify goals, design pre- and post-trip activities, and create a meaningful field experience. Any custom trip should have at least the impact of the standard trips. It should also mesh closely with the on-going curriculum. The classroom teacher and EE/IDS staff would share development responsibilities.

—————> CALL 275-3033 <—————

FEBRUARY			
SUNDAY	MONDAY	TUESDAY	WEDNESDAY
		1	2
		8	9
6	7	15	16
13	14	22	
20	21	28	29
27			

PARENT PERMISSION FORM

As parent or legal guardian, I hereby grant permission
for _____ to take
(student's name)
part in a field trip to the J. N. "Ding" Darling
National Wildlife Refuge via bus on _____
(date).

I understand that this trip is an integral part of
the ongoing school curriculum, and that the students
will be studying bird life and will be walking
portions of the Wildlife Drive.

Parent or Guardian

(date)

(emergency phone number)

This publication is one of the teaching units in the community studies series developed by the Lee County Schools, Florida.

The community study series is designed to assist teachers and students in learning through experience how the Lee County communities function, and the rights and responsibilities each of us shares in maintaining a healthy, productive community.

By systematically experiencing our community, students tend to see the pattern that connects the natural and cultural environment, and how each of us is an independent agent for change.

The community study instructional units have been field tested by teachers and students.

All guides are COPYRIGHTED. Full permission is granted for non-profit educational use.

The units have been produced by the staff of THE DEPARTMENT OF ENVIRONMENTAL EDUCATION AND INSTRUCTIONAL DEVELOPMENT SERVICES of Lee County School system:

Bill Hammond	Director
Jo Ellen Kessler	Acting Director
Craig Hortman	Resource Teacher
Rick Tully	Resource Teacher
Debra Dorsett Hanson	Resource Teacher
Keith Hanson	Resource Teacher
Neil Wilkinson	Resource Teacher
Cindy Bear	Helping Teacher
George Parker	Helping Teacher
Eileen Spencer	Adv. Co. Staff Secretary
Lynette Dean	Secretary

with special contributions from former EE/IDS staff members, Lee County teachers, district staff, students, and members of the community.

Lee County Schools
Environmental Education/
Instructional Development Services
2055 Central Avenue
Fort Myers, Florida 33901
813-275-3033



TEACHER EDITION

COMMUNITY STUDY UNIT SUPPLEMENT
FIELD TRIP GUIDE FOR TEACHERS



ADAPTATION

COMMUNITY STUDY UNIT

GRADE 6

LEE COUNTY SCHOOLS

CLASSROOM TEACHER GUIDE

TO

SIXTH GRADE

ADAPTATIONS FIELD TRIP

Trip Site: J. N. "Ding" Darling National Wildlife Refuge

HOW TO USE THIS GUIDE

This field trip guide is written for the classroom teacher who is planning to lead an environmental education field trip without the assistance of an Environmental Education and Instructional Development Services (EEIDS) staff member. Please read this guide carefully. Note the safety precautions and equipment lists.

The activities are arranged in the sequence usually followed by EEIDS staff members. However, once you have read this guide and considered the needs of your class, you may choose to rearrange, add, delete or adapt activities to fit your situation. There are more activities described here than you will need. Consider them all as options from which you can select the most appropriate activities for your particular class.

In the event that several classes are at the Wildlife Refuge at the same time, you should be prepared to adjust your schedule so that you are not all trying to use the same space at the same time.



EQUIPMENT

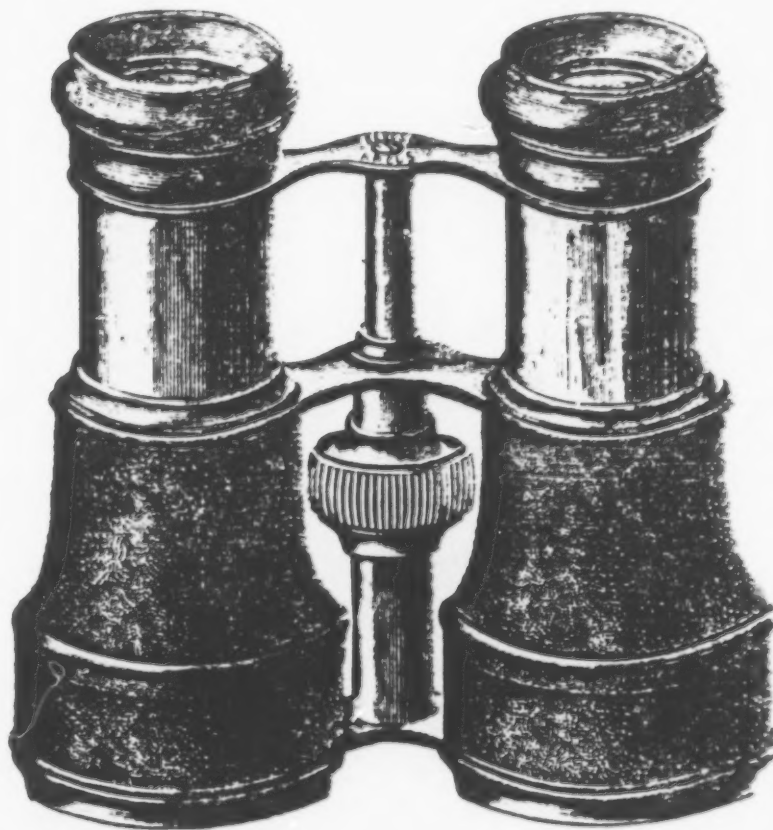
The following is a list of equipment and supplies you may need for this field trip. Some of them are optional. Some can be provided by EEIDS, while some must be provided by the school or teacher. The teacher is responsible for calling the Department of Environmental Education (275-3033) to arrange for pick-up and drop-off of borrowed equipment.

Can be provided by EEIDS:

Bird pictures
Bird field guides

Should be provided by teacher:

Pencils
Cooler with lunches/drinks/ice
First aid kit
Trash bags
Binoculars (encourage students
to bring their own if possible)



PREPARATIONS FOR A SUCCESSFUL FIELD TRIP

Prior to the Trip

1. Carefully read all materials sent to you by the Department of Environmental Education and Instructional Development Services.
2. We highly recommend that you visit the field trip site yourself before taking your class. It will help you be more familiar with the area and any potential problems as well as with places for leading your activities.
3. Ask the Department of EEIDS for the slide/script program designed for your trip. It will help familiarize you and your students with the trip.
4. Prepare your students for the trip by doing the activities in the teacher unit and by explaining to them what they should expect while on the field trip.
5. Call EEIDS if you have any questions regarding the field trip site or activities.
6. Find out if there are any students in your class with allergies, especially to insect bites or stings.

On the Field Trip

1. Good student behavior on field trips is just as important as in the classroom. Be sure to review with your students all the rules and policies for behavior and safety as well as the consequences for breaking those rules.
2. Demonstrate proper and safe use of all equipment and supplies to be used during the day.
3. Make sure students and adults always wear tie-on or velcro-closure shoes during the trip.
4. Be sure all students are well-supervised at all times during the day including while on the school bus. Do not send students to sit on the bus unsupervised at any time.
5. No flammable liquids are allowed on the bus.
6. If a first aid need arises, do everything possible to assure safety of all students and ask the bus driver to radio for help if necessary.
7. There are no bathrooms available on this trip, so be sure students go before leaving the school. Limit beverage intake.

Special Considerations for

SIXTH GRADE

ADAPTATION TRIP

1. Students should abide by all the refuge rules posted at the beginning of the Wildlife Drive.

2. Do not allow students in or near the water's edge. There are other animals at the refuge besides birds...alligators, snakes, raccoons, otters, etc. can be seen along the way. Students should not feed or harass any of the wildlife or damage plants.

3. If you see an alligator, keep a safe distance. They are never predictable!

4. Ask students to use good judgement around other tourists and their vehicles. Students should keep voices low and walk slowly along the drive to avoid scaring away any birds near the road.

5. Keep the group together by having them follow the bus along the drive. Students should not go beyond the front of the bus.



BUS ORIENTATION

When the students have boarded the bus, hand out the "Adaptation" fieldbooks. Review with the class the purpose of the field trip. Review the concept of "adaptation", giving examples of both natural and cultural things that are adapted to perform a specific function (i.e., why are toilet seats round?, etc).

Have the students look through the fieldbooks on the drive out to the Refuge. Tell them that you will explain the book further and tell them a little about J. N. "Ding" Darling when you get to the Refuge. Remind the class of the rules for riding on the bus safely.

1. Remain in seats,
2. Keep everything inside the windows,
3. Talk softly,
4. No eating or drinking on the bus.

ARRIVAL AT THE REFUGE

When you arrive at the Ding Darling National Wildlife Refuge on Sanibel Island, ask the driver to park the bus just before the first open area of water along the wildlife drive. Keep the students on board while you explain the way the fieldbook is to be completed, the best methods for observing birds, and the rules for behavior while in the Refuge (both on and off the bus). If you have binoculars to share, show the students the proper methods of caring for and adjusting them. Pair the students or put them into small groups to share binoculars.

THE REFUGE

Tell the students a little about who "Ding" Darling was and why the Refuge was established. The Teacher's Edition and the student classbook will help provide information. The Refuge is federal land and open to the public, but set aside for the purpose of providing habitat protection for wildlife. It was named after J. N. "Ding" Darling in honor of his efforts to protect wildlife throughout the United States. Emphasize that the Refuge is a place in which all living things are protected by law. No plants should be picked or damaged and no animals should be fed, scared, or harassed in any way. The Refuge is home to thousands of wintering birds and therefore attracts thousands of bird-watchers from throughout the world. It is essential that the students walk, look, and work quietly and without disturbing the other visitors to the Refuge. They should pay particular attention to those that may be photographing or painting the wildlife along the drive.

The speed limit within the Refuge is 20 miles per hour so the students will have to be careful when walking along or crossing the drive. The drivers are looking at the wildlife, not at the students!

There are many other animals residing in the Refuge besides birds - snakes, alligators, otters, turtles, crabs, fish, etc. For safety reasons and to protect the vegetation growing along the shore, the students should remain up on the edges of the road and away from the water.

THE STUDENT BOOKLET

Go through the student fieldbook with the students. It is divided into sections based upon the characteristics shared by all the birds in each section. The questions in each section should be answered based upon observation of one particular bird from that section. To help with identification, be sure the students know to look for the size of the bird, general body color, behaviors (how they eat, walk, interact with other birds, etc.), and such characteristic field marks as leg shape and color and bill shape and color.

The grid found in the back of each section should be completed for every bird the student sees from each section.

OBSERVING ALONG THE WILDLIFE DRIVE

The general procedure for observing the birds and recording information in the booklet is for the students to get off the bus after the orientation is complete and begin their work in the area of the first open body of water. Help them begin their observations and recording, then ask the driver to drive the bus along the road to the next corner beyond the open area and park there. Instruct the students to work in the area from where they were let off to the point where the bus is parked. Do not allow the students to go beyond the parked bus. Continue to assist students with their observations if they need it. When the majority of the class has reached the bus, and observations have been made of most of the birds visible in the first open area, have the students board the bus and drive up to the next open area. Let the students off, and have the driver park the bus a few hundred yards ahead. Have the students continue their observations, looking for birds from each different section of their booklets. By the time the class reaches the bus at the far end of the second open area it will be close to lunch time. **DO NOT** have the bus driver drive all the way to the dike or the tower and expect your students to walk the entire two (or so) mile distance. They will never make it! So do the trip in short stretches along the road.

LUNCH

Board the bus and briefly review with the students the birds the group has seen so far. Have the students watch out the bus windows for more birds as you drive to the lunch site. Park the bus along the road near the dike that runs off to the left of the main road just prior to the observation tower. Have the students eat their lunches in a group near the beginning of the dike. Do not allow the students to feed the birds or any other animals. After lunch, collect all trash and food scraps and place the trash bags and lunch coolers on the bus.

WALK ALONG THE DIKE

If time permits, you may wish to take a hike along the dike after lunch to look for more birds (or for alligators). This is often a good spot to see spoonbills, storks, coots, moorhens, and ducks. Have students complete their workbooks between here and the observation tower back out on the main drive.

THE DRIVE OUT OF THE REFUGE

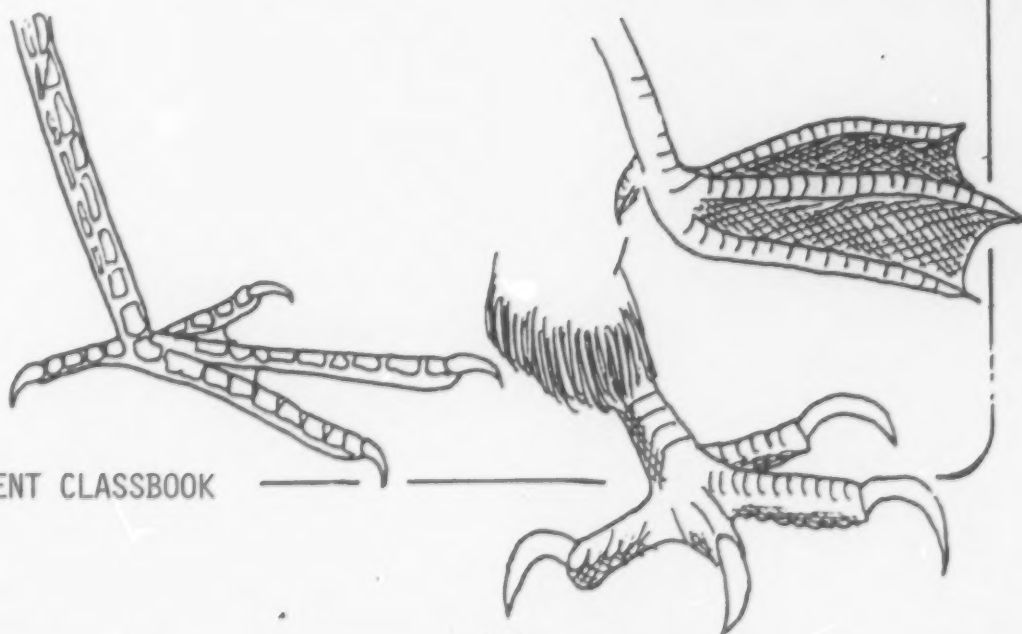
By the time you reach the observation tower, it will be time to have the students board the bus for the drive out of the Refuge. There are still several more miles of wildlife drive left but you will probably not have time to stop and get out again. Have the students watch out the windows for any birds that have not yet been observed. The driver and you will need to allow at least 20 - 30 minutes for the drive to the end of the wildlife drive.

THE DRIVE BACK TO SCHOOL

If you have a selection of pictures of birds commonly found at the Refuge, pass them around the bus during the ride back to school. These pictures may help the students complete the grids for each bird they observed. Have the students complete the three pages of review questions at the back of their student fieldbooks. At the school, review the concept of adaptation with the class and discuss some of the birds seen during the trip (favorite birds, unusual birds, observation "firsts", endangered species, etc).



ADAPTATION



STUDENT CLASSBOOK

9/85



THE SCHOOL BOARD OF LEE COUNTY

**2055 Central Avenue
Fort Myers, Florida**

Colonel Ted San S. Timberlake
Chairman

Grace D. Bartleson
Vice Chairman

Mary M. Laurel

Suzi Martin, Ph.D.

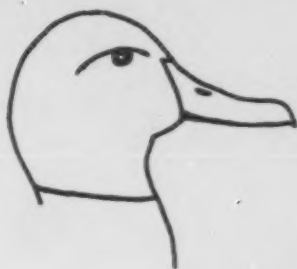
Barbara Wallace

Karl Engel
Superintendent

Dr. Charles Godwin
Asst. Superintendent for Instruction

Dr. J. P. Lutz
Director, Elementary Education

Dr. William Hammond
Director, Instructional Development Services and Environmental Education

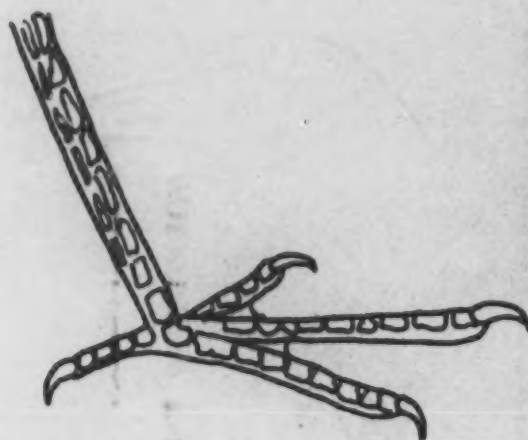
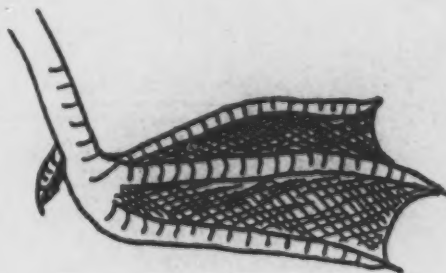
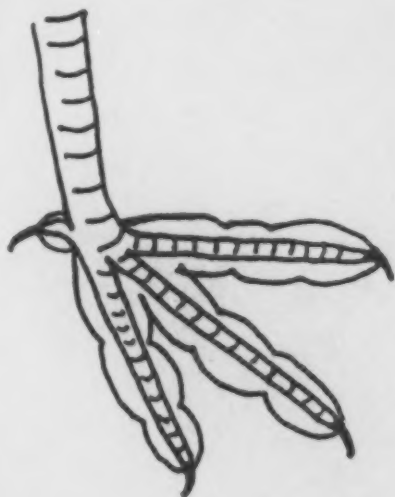


What's my line?

FEET

FOR

THOUGHT

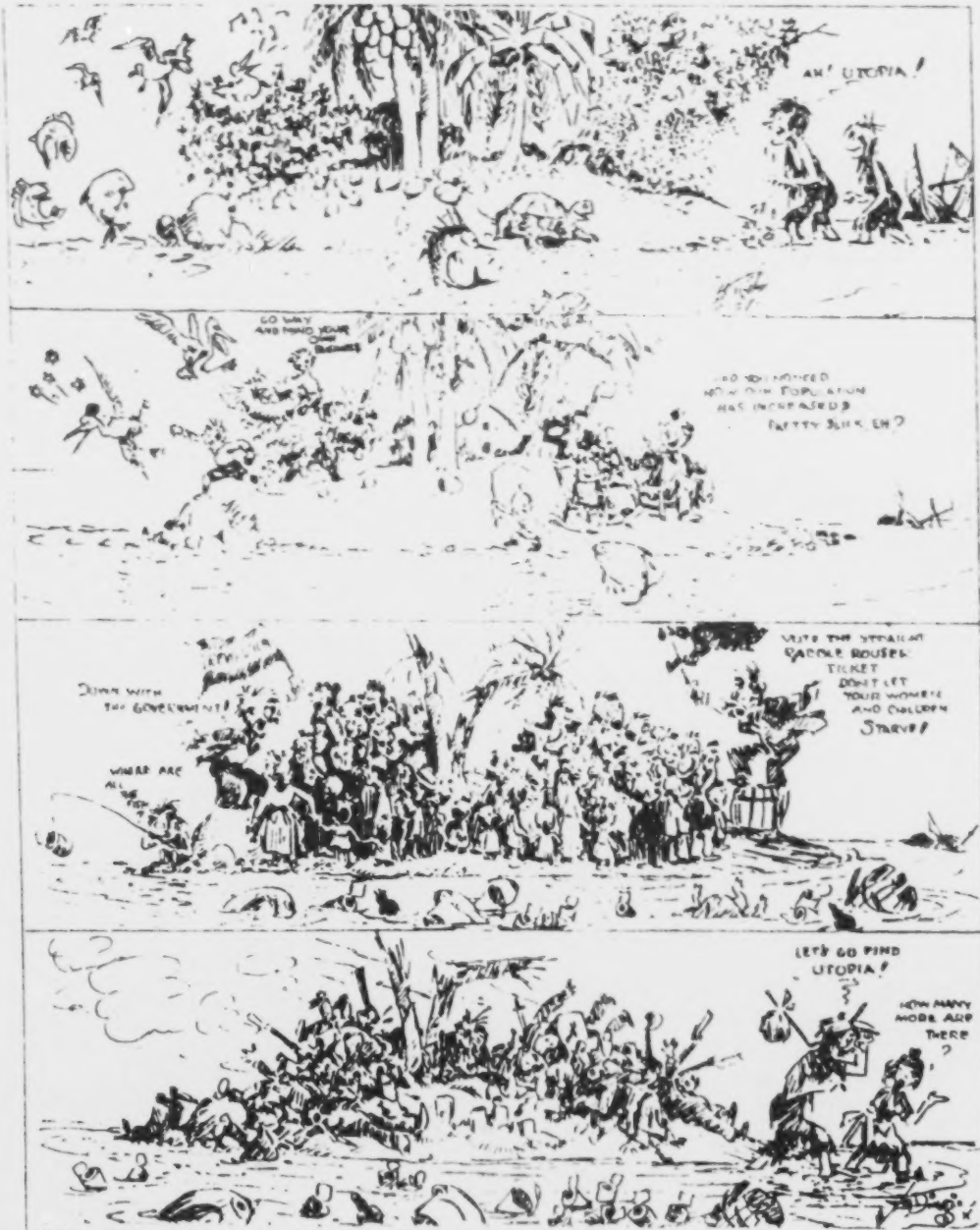


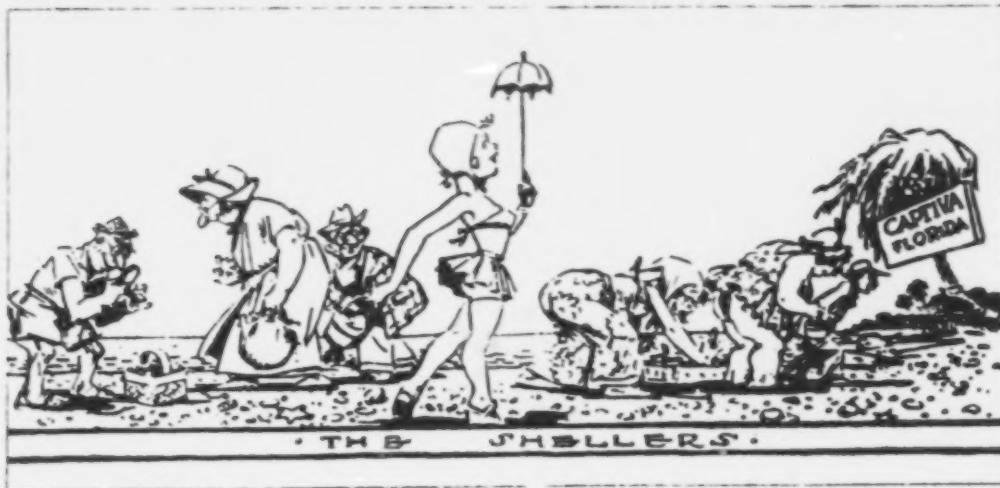


"DING" DARLING: CARTOONIST AND CONSERVATIONIST

Jay Norwood "Ding" Darling (1877-1962), cartoonist and conservationist, was born in Norwood, Michigan. He attended college in Wisconsin and South Dakota, after which he went to work for the Sioux City Iowa Journal. He soon became a cartoonist for the Des Moines Register. As he rose to the top rank among political cartoonists his work was syndicated to 130 daily newspapers, including the New York Herald Tribune.

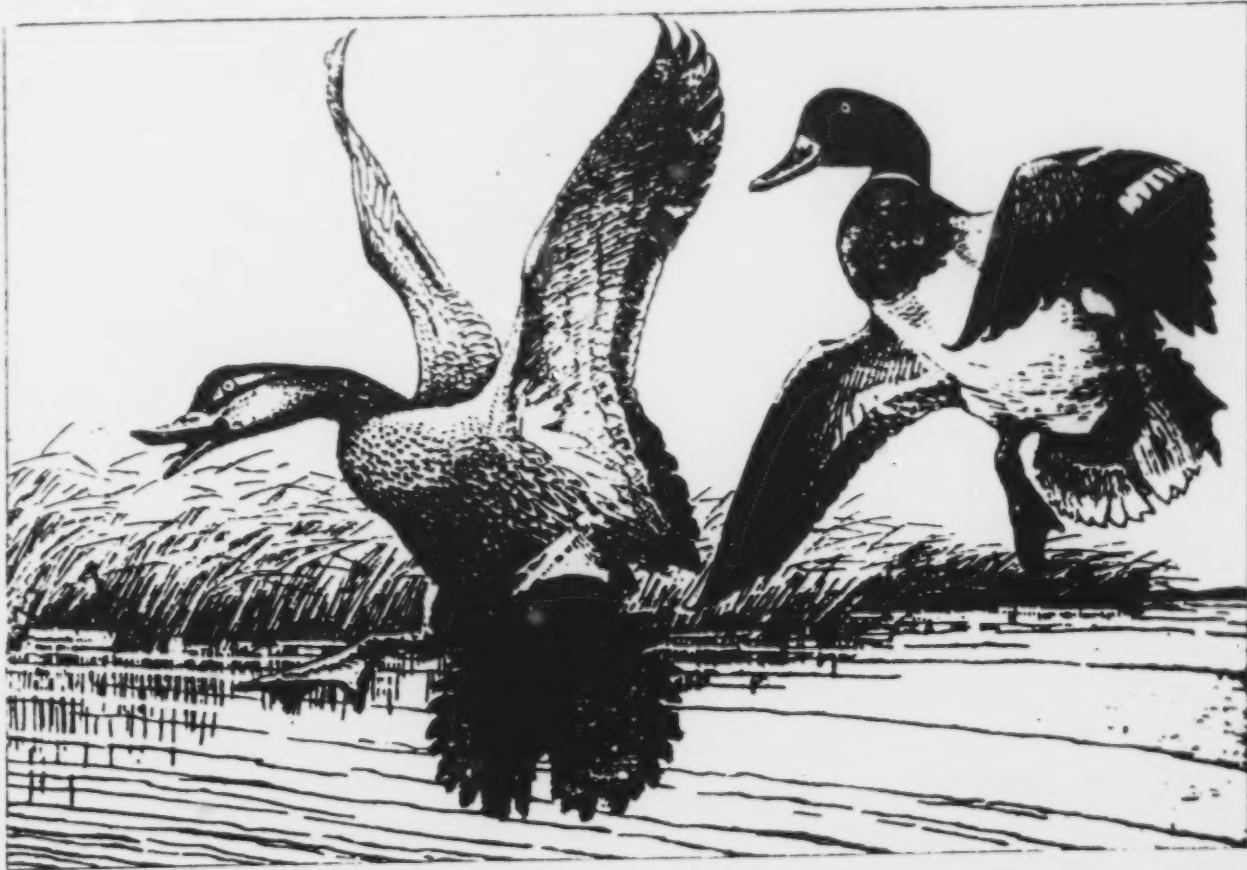
He reached an audience of many millions all over the country with cartoons noted for their wit and political satire. He was awarded Pulitzer prizes in 1923 and 1942, and in 1934 was named the best cartoonist by the country's leading editors. He signed his cartoons with the nickname "Ding."





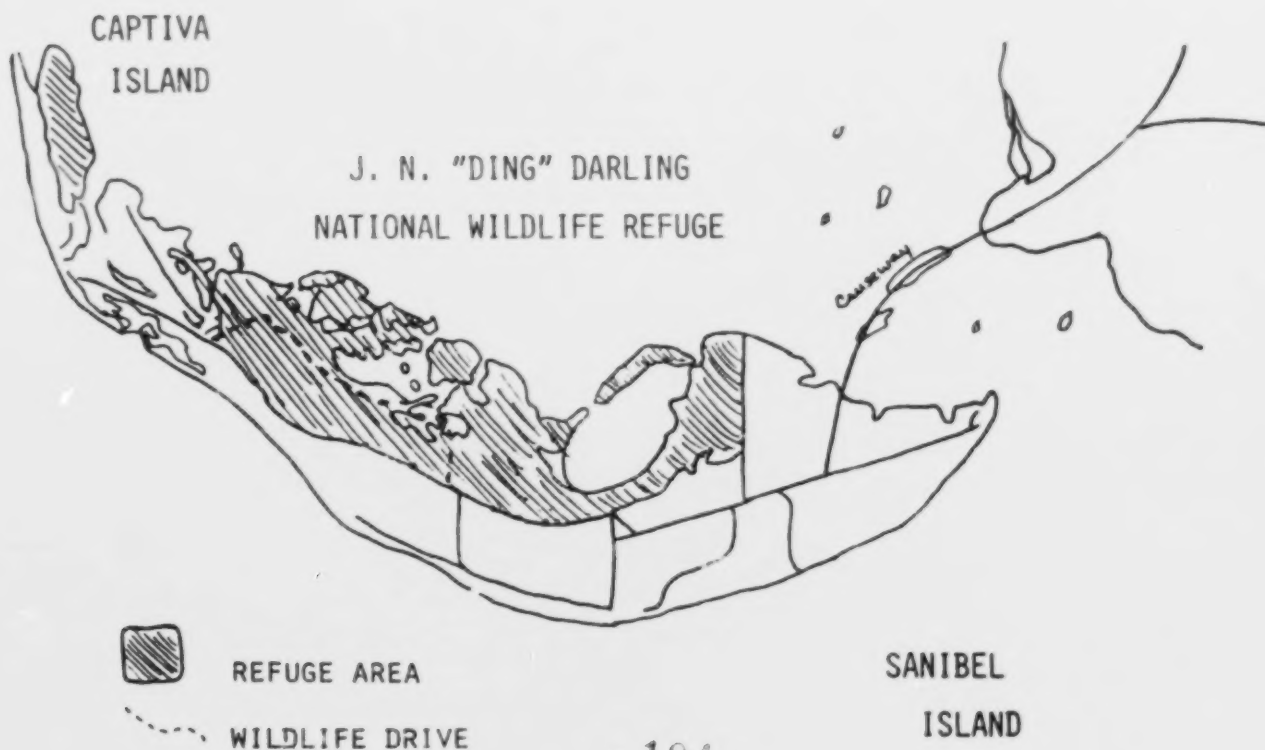
Besides politics, Mr. Darling had another great love in which he was well ahead of his time. That was conservation. Long before others had joined the call, Mr. Darling was concerned about the extinction of wildlife, air and water pollution, and other threats to the environment. These themes were often worked into his cartoons, and in July of 1934 President Franklin Roosevelt asked him to head the U.S. Biological Survey, which later became the present U.S. Fish and Wildlife Service. In this capacity, Darling battled with fervor for greater national attention and expenditures for wildlife conservation. His memos and letters to President Roosevelt were forceful, witty, and often illustrated with pointed cartoons. He had many a lusty argument with Secretary of the Interior Ickes who, in his diary, described Darling as "one of the greatest enthusiasts I have ever known." With this enthusiasm, Mr. Darling was largely responsible for securing from the Administration and Congress some \$17 million for wildlife restoration. He established the migratory bird conservation commission and made great strides toward bringing hunter and conservationist together, pioneering leadership in the field of proper game management.

He drew the first federal duck stamp and was largely responsible for the establishment of the network of game refuges in the country today. He was called "the best friend the ducks ever had." He liked to remind overzealous developers that ducks can't lay eggs on a picket fence.



For many years Mr. Darling had a winter home on Captiva Island where he worked to bring about the principles he was recommending for the nation.

He helped to secure land and to establish on Sanibel Island what is known as the Bailey Tract of the J. N. "Ding" Darling National Wildlife Refuge. Before his death, the Bailey Tract was purchased by U. S. Fish and Wildlife Service and, after he died, a group of his island neighbors formed the "Ding" Darling Committee. Through the efforts of that committee, the large refuge tract which bears his name was acquired by the Federal Government and the Sanibel National Wildlife Refuge was renamed in his honor. The land was turned over to the Fish and Wildlife Service by the State of Florida and the memorial committee became the Sanibel-Captiva Conservation Foundation. The J. N. "Ding" Darling Foundation was established in Des Moines to carry on other aspects of his conservation ideals.





WHAT IS THIS CARTOON
TRYING TO SAY?

Eventually, Why Not Now?



WHAT IS THIS CARTOON TRYING TO SAY?

INSECT SPECIALTIES



Work in groups of four. Each of your groups should make a simple live insect collection over the weekend or after school. Each group collection should include: grasshopper, roach, butterfly or moth.

If possible, put each animal in a small baby food jar. We will let all the animals go after a day or two. Make sure that you have a small nail hole in the jar top, so that air can enter.



Once you have your collection, answer the questions about the insects' adaptations. Let's start by studying the roach in your collection.

1. Is the roach's body fat and rounded, or it is flat and wide?

2. Are the legs smooth, or do they have small spines on them?

3. Are the antennae short, or are they about as long or longer than the roach's body?

4. Are the eyes large or small?

Now let's see how these adaptations help the roach survive. First of all, roaches are usually found underneath the bark of old trees or living under logs and piles of dead leaves.

5. How does the flat body of the roach help it survive?

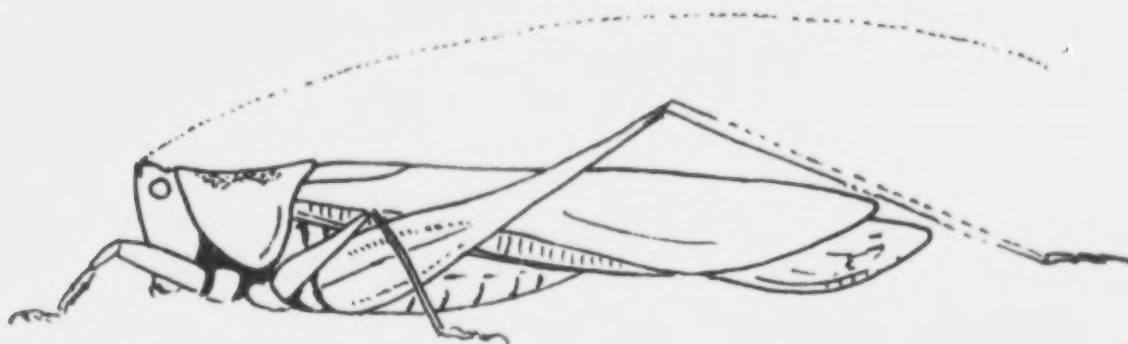
6. What do you think the spines on the roach's legs help it to do? (Remember where roaches live.)

Antennae on an insect help the insect find his way around. The antennae "feel" around for food as well as warning the insect of his enemies.

Look at your answers to questions #3 and #4 in this section.

7. When do you think the roach feeds: in the daytime, or at night?

Since they have small eyes, and large antennae, roaches usually feed at night. The spiny legs help to hold the animal from falling as it climbs around on the bark and leaf piles. Its flat body allows it to crawl into small narrow spaces.



Now let's examine the grasshopper.

Look at the eyes and antennae first.

8. Why do you think this animal feeds during the daylight hours?

Look at the large hind legs of the grasshopper. These legs are adapted for jumping. These legs can push the animal from one area to another. Now look at the animal's front legs.

9. Do the bottoms of the front pair of legs point forward, or do they point backwards? _____

10. Try to guess why the direction in which the front legs point is an important adaptation for a grasshopper. _____

To show yourself why this is important, imagine that you are sliding headfirst down a sliding board.

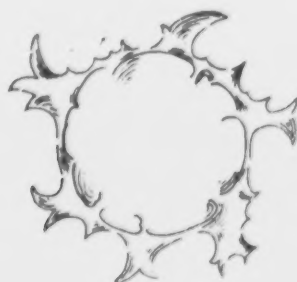
11. Would it be easier to stop sliding if you put your hands out in front of you, or behind you? _____

You can see that when a grasshopper jumps from one leaf to another, it must be able to stop fast. If it couldn't stop, it would slide off the new grass blade.

Now look even closer at the legs.

12. Are they smooth, or covered with spines? _____

13. How do you think these spines help the grasshopper as it moves around on the plants? _____





Now examine the butterfly or moth. These animals feed on nectar found in flowers.

14. How do the animal's wings help it survive? _____

The wings can help the animal escape from its enemies, but just as important, the wings carry the butterfly to new flowers. Was your answer to question #14 similar to what you just read? _____

Hold the animal very carefully. Take the point of your pencil and very gently run the pencil point across the bottom of the animal's head.

15. Did you see a coiled tube extend from the butterfly's head?

If you didn't, try again.

This tube is a special adaptation used for feeding. Nectar is a liquid, and the tube is like a long coiled straw. The butterfly sucks nectar from the flower into its mouth.

If you brought in any other insects, try to figure out how their adaptations help them to survive. Look for wings, jumping legs, large eyes, antennae, spines on their legs, special mouth parts, and their body shape. When you put your observations and facts about where the

animal lives together, you should be able to explain how some of the body parts aid in survival.



This publication is one of the teaching units in the community studies series developed by the Lee County Schools, Florida.

The community study series is designed to assist teachers and students in learning through experience how the Lee County communities function, and the rights and responsibilities each of us shares in maintaining a healthy, productive community.

By systematically experiencing our community, students tend to see the pattern that connects the natural and cultural environment, and how each of us is an independent agent for change.

The community study instructional units have been field tested by teachers and students.

All guides are COPYRIGHTED. Full permission is granted for non-profit educational use.

The units have been produced by the staff of THE DEPARTMENT OF ENVIRONMENTAL EDUCATION AND INSTRUCTIONAL DEVELOPMENT SERVICES of Lee County School system:

Bill Hammond	Director
Jo Ellen Kessler	Acting Director
Craig Hortman	Resource Teacher
Rick Tully	Resource Teacher
Debra Dorsett Hanson	Resource Teacher
Keith Hanson	Resource Teacher
Neil Wilkinson	Resource Teacher
Cindy Bear	Helping Teacher
George Parker	Helping Teacher
Eileen Spencer	Adv. Co. Staff Secretary
Lynette Dean	Secretary

with special contributions from former EE/IDS staff members, Lee County teachers, district staff, students, and members of the community.

Lee County Schools
Environmental Education/
Instructional Development Services
2055 Central Avenue
Fort Myers, Florida 33901
813-275-3033



ADAPTATION



**HOW TO MAKE IT
IN A BIRD'S WORLD!**

Grade 6

Community Study Guide
Lee County Schools
2055 Central Avenue
Fort Myers, Florida 33901



THE SCHOOL BOARD OF LEE COUNTY

2055 Central Avenue
Fort Myers, Florida

Colonel TedSan S. Timberlake
Chairman

Grace D. Bartleson
Vice Chairman

Mary M. Laurel

Suzi Martin, Ph.D.

Barbara Wallace

Karl Engel
Superintendent

Dr. Charles Godwin
Assistant Superintendent for Instruction

Dr. J. P. Lutz
Director, Elementary Education

Dr. William Hammond
Director, Environmental Education and Instructional Development Services

FAST-FINDER GUIDE

Introduction.	2
Bill Shapes	3
Foot Shapes	3
SECTION A: Herons and Egrets	4
SECTION B: Wood Stork - Ibis - Spoonbill	9
SECTION C: Ducks	11
SECTION D: Mergansers.	16
SECTION E: Coots and Moorhens.	17
SECTION F: Other Birds	20
Grid.	26
Dare to Compare	27
Who Eats What?.	28
Review.	29

Adaptation: How To Make It In A Bird's World

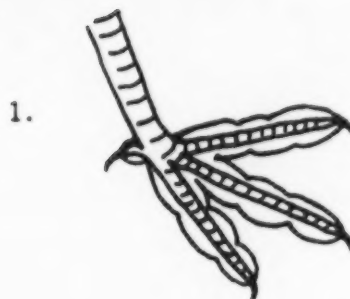
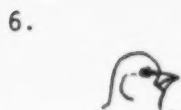
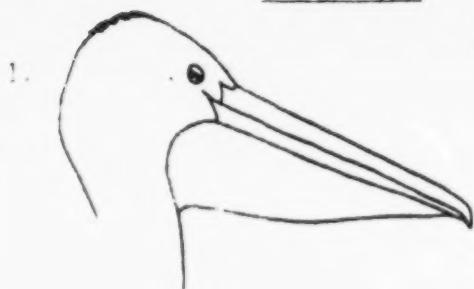
This student fieldbook will guide you while you are at the field site observing many different kinds of birds. This book is divided into sections according to the particular adaptations of different types of birds. When you see a bird, identify it by the pictures in this book. Then, answer the questions in the section where you found that bird's picture. You will find it helpful to sit and watch the bird for several minutes before answering any questions. Look carefully at its physical characteristics and watch what the bird is doing. Watch how it moves, how and what it eats, and how it interacts with other birds. Use your binoculars for more detailed observations!

Following the questions, you will find a grid in which you should record bill, foot, and leg shape and color; bird size; and what the bird eats. Fill in the grid as accurately as you can. Record what you see, not what you think you should see. Use the keys to bill and foot shapes on the following page. Write in the actual colors and record leg shape as S = short or L = long.

KEY TO:

Bill Shapes

Foot Shapes

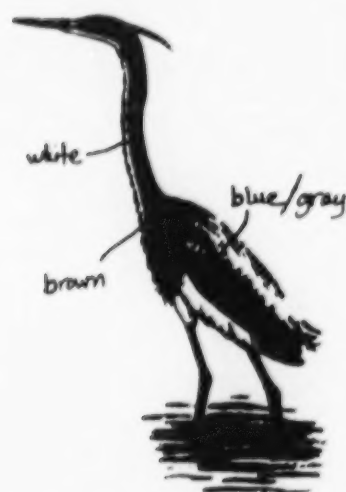


Bills and Feet
-3-

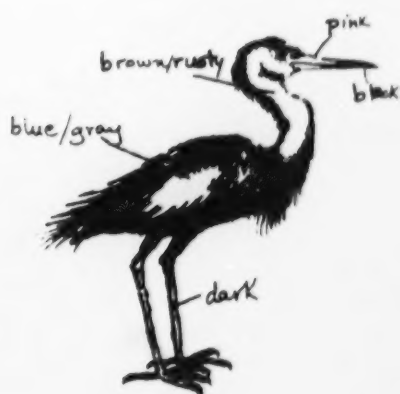
SECTION A - Hérons and Egrets



Great Blue Heron



Tricolored Heron



Reddish Egret

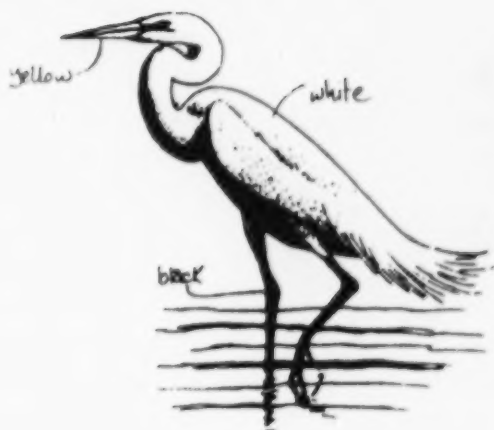


Little Blue Heron



Yellow-crowned
night Heron

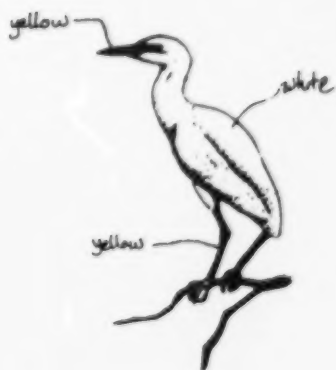
MORE HERONS AND EGRETS



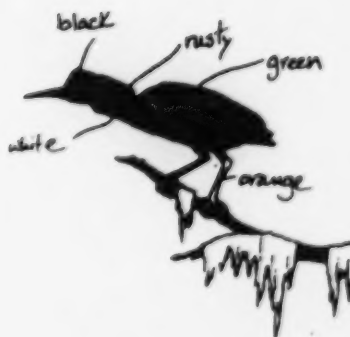
Great Egret



Snowy Egret



Cattle Egret



Green-backed Heron

SECTION A - Questions about the Wading Birds

1. Which bird are you observing? _____
2. Is the bird swimming or wading? _____
3. Are the bird's legs as long or longer than its body, or are its legs shorter than its body? _____
4. Is the bird's neck long, or is the neck short? _____
5. If you were a bird, do you think it would be easier to see a wide area of water with short legs and a short neck, or would it be easier to see down into the water if you had a long neck and long legs? _____
6. Is the bird's bill flat and rounded, or is it narrow and pointed? _____
7. Let's quickly review what we have observed so far about this bird; it has long legs, a long neck, and a sharply pointed beak. Now the big question: What do you think the bird eats? _____

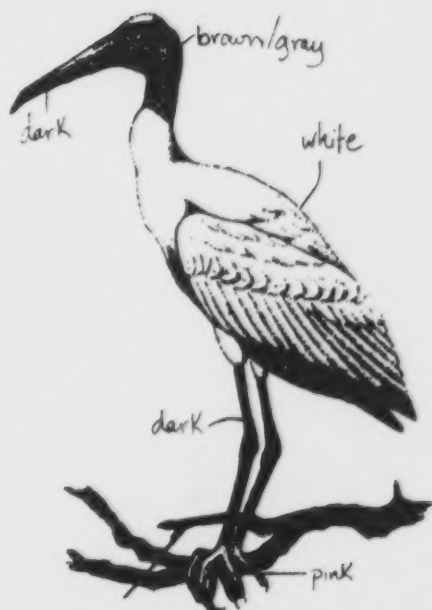
8. Now, try to explain how you think this bird is able to get this type of food. (Be specific.) _____

9. Watch your bird as it feeds; briefly describe its actions. (Does it stand still? Does it chase after food? How does it use its bill? Its neck? Does it look into the water? Does it stand in deep water? Shallow water? Along the shore?)

Now list your observations on these actions and as many other actions as you can observe.

	Bill Shape	Bill Color	Leg Shape	Leg Color	Foot Shape	Foot Color	Bird Size	Eats
Great Blue Heron								
Tricolored Heron								
Little Blue Heron								
Green-backed Heron								
Great Egret								
Snowy Egret								
Yellow-crowned night Heron								
Reddish Egret								
Cattle Egret								

SECTION B - Wood Stork/White Ibis/Roseate Spoonbill (more waders)



Wood Stork



White Ibis



Roseate Spoonbill

1. Which bird are you observing? _____
2. Draw a picture of the bird's bill: _____
3. Does this bird have long legs? _____
4. Does it have a long neck? _____
5. As you watch the bird, does it place its bill down in the water?

6. What does it do with its bill when it is in the water? _____

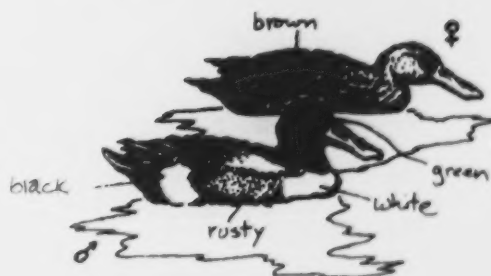
Ibis/Stork/Spoonbill

7. These wading birds like to probe in the mud or use their feet to scare food into their bills. Watch these birds and see if you can tell what they eat. _____

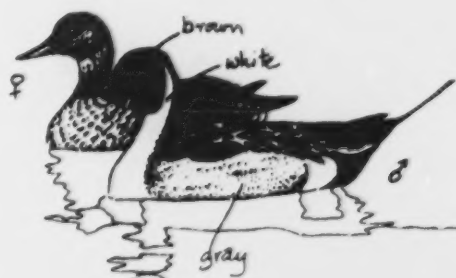
	Bill Shape	Bill Color	Leg Shape	Leg Color	Foot Shape	Foot Color	Bird Size	Eats
White Ibis								
Wood Stork								
Roseate Spoonbill								

Ibis/Stork/Spoonbill

SECTION C - Ducks



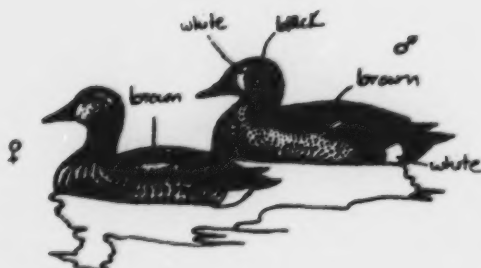
Northern Shoveller



Pintail



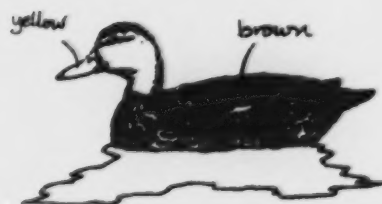
Lesser Scaup



Blue-winged Teal



American Widgeon



Mottled Duck

See page 23 for
a bird that looks
like a duck but
is not one.

SECTION C - Questions about Ducks

1. Which duck are you watching? _____
2. Are these birds swimming or wading? _____
3. Are the bird's legs shorter or longer than its body? _____

4. Is the bird's neck longer or shorter than its body? _____

5. Is the bird's bill sharp and pointed, or is it broad and flat? _____

6. From what you know about fish, are they easy to hold or are they slippery and hard to hold? _____

7. If you could get close enough to one of these birds, you would see that the bird's bill is very smooth and that there are no teeth on its bill. In your opinion, would this bird have trouble hanging onto a fish with its bill? _____
8. If this bird is unable to catch fish, then it must be feeding on something else. What do you think the bird is eating? _____

9. Let's watch the bird's activities for a few minutes. Is the bird diving under the water, or is it simply tipping its head and front part of its body under the water? _____

10. There are two main groups of ducks. One group is called the diving ducks and the other group is the surface feeding ducks. What type of duck are you watching? _____
11. Surface feeding ducks are mainly plant eaters. Diving ducks go under the water and eat plants and sometimes snails, crabs, and shrimp. Now, where does the duck you are watching find its food: near the bottom, or near the surface of the water? _____

12. Since these birds seem to spend so much time swimming in the water, they must have some special adaptations for this type of life. Are the duck's legs nearer the front or nearer the back of its body? _____
13. When a duck is on land, does it walk with a waddling back and forth motion, or does it walk smoothly? _____

14. When the duck swims, does it seem to be moving through the water with a smooth forward motion, or does it seem to be jerking in its movement through the water? _____

15. From your observations, do you feel that the position of the duck's legs is better adapted to walking or swimming? _____

16. A duck's feathers are covered with an oil that the animal produces.
Can you give a reason for this? _____

17. If you had trouble with question #16, try to answer this question.
It may help you understand the reason for covering the feathers with
oil. If you placed a piece of waxed paper and a piece of paper towel
in water, which one would soak up the most water? _____

Why did you give the answer you did? _____

18. Now, once again, why do you think the duck produces an oil to
cover its feathers? _____

So far, we have observed two types of birds: the fish eating
egrets and herons, and the plant eating ducks. We have observed
some of the important adaptations that allow these birds to live
where they do and to catch the types of foods they need to stay
alive. The wide flat bill of the duck helps the animal collect
water plants, while the sharp bill of the herons and egrets makes
an excellent fish grabber or spear.

The long legs and neck make it easy for the herons to spot fish,
while the position and shortness of the duck's legs allow it to
swim well. If you were lucky enough to see the feet of these
two types of birds, you probably noticed that the duck has webbed

feet which help push it through the water, and that the herons and egrets have very long, spreading toes which help them stand and walk.

<u>Diving Ducks:</u>	Bill Shape	Bill Color	Leg Shape	Leg Color	Foot Shape	Foot Color	Bird Size	Eats
Lesser Scaup								

<u>Surface Feeders:</u>								
American Widgeon								
Pintail								
Blue-winged Teal								
Green-winged Teal								
Northern Shoveller								
Mottled Duck								

SECTION D - Red-breasted Mergansers - A Duck of a Different Kind

See if you can find a merganser. A merganser is also a duck, but it is adapted to eat and move differently than the other kinds of ducks.



1. Does this bird have a bill as broad as the other ducks' bills?

2. Examine the drawing of the merganser's bill above. How is it different from other ducks' bills? _____

3. Does the merganser dive below the surface? _____

4. What do you think the merganser eats, and why do you think it eats these things? _____

	Bill Shape	Bill Color	Leg Shape	Leg Color	Foot Shape	Foot Color	Bird Size	Eats
Merganser								

SECTION E - Coots and Moorhens

There are two other birds that you are likely to see today. Pictures of these birds are below. See if you can spot one or both of these birds. Pay particular attention to where these birds are located (close to shore, swimming in the water, etc.).



American Coot



Common Moorhen

1. How is the shape of these birds' bills different from the duck's or the heron's and egret's? _____

Draw pictures of the different bills in the space below.

Heron

Coot and Moorhen

Duck

2. The shape of the moorhen's and coot's bill is very much like that of a chicken, kind of short and cone-shaped.

This type of bill is very effective in catching insects and picking up seeds and other plant material. If you watch a moorhen closely, you might be able to see its feet. The moorhen's feet also resemble a chicken's feet but are much larger.

Coots/Moorhens

Do the moorhens spend more time on the shoreline or in the water?

3. The shoreline areas are usually muddy and soft. How do you think the large spreading toes of the moorhen's feet help the bird in these muddy areas? _____
-

The coot's feet are similar to a moorhen's, but the coot has lobes of skin along its toes.



Coot's foot



Moorhen's foot

4. Where do the coots seem to be spending most of their time, near the shore, or in the water? _____
-

The lobes of skin on the coot's feet help it swim. The skin lobes act very much like the web of skin between a duck's toes.

5. What is the advantage of having the lobed toes that the coot has? _____
6. Usually, if two types of animals feed on the same general kinds of foods, they are not found living in the same area. Both the coots and moorhens feed on insects, small water animals and plant material. Why are these animals able to live so closely together, when other animals that eat the same foods are unable to live together?

Coots/Moorhens

(Remember what you have learned about the feet of each bird and where you observed the birds feeding.)

Adaptations allow animals to survive in their environment. You have seen some bird adaptations today. As you look at other birds in the sanctuary, see if you can determine what they eat and what adaptations they have that allow them to survive.

	Bill Shape	Bill Color	Leg Shape	Leg Color	Foot Shape	Foot Color	Bird Size	Eats
American Coot								
Common Moorhen								

Coots/Moorhens

SECTION F - Other Birds in the Refuge

This section identifies other birds not included in the previous sections. Watch for and identify as many of these birds as you can. Complete the questions which follow the pictures. The grid of characteristics is at the end of this section. Have fun, and happy birding!



Ground Dove



Sparrow



Cardinal

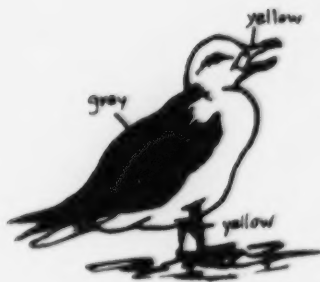
1. The bill on these birds is very short and thick. These birds feed mainly on seeds and insects. In your opinion, why didn't these birds develop a longer more slender bill that could snatch up insects?

2. Did you see any of these birds feeding near the water or were they near the road area? _____

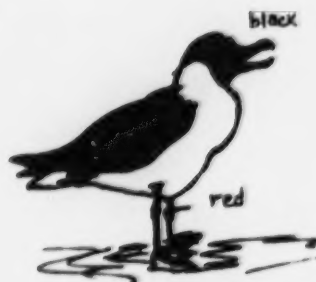
Seeds are very hard to digest, so many birds eat small stones that grind up the seeds.

3. Why do you think they feed near the road? _____

Gulls



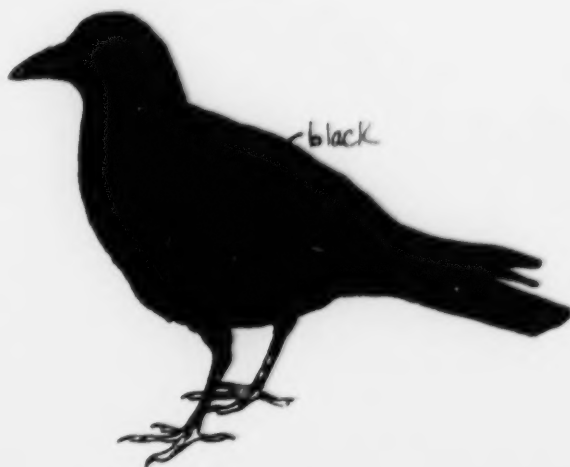
Ring-billed Gull



Laughing Gull

1. The gulls are sometimes scavengers but they also eat live things.
2. Watch to see how they search for and capture their food.

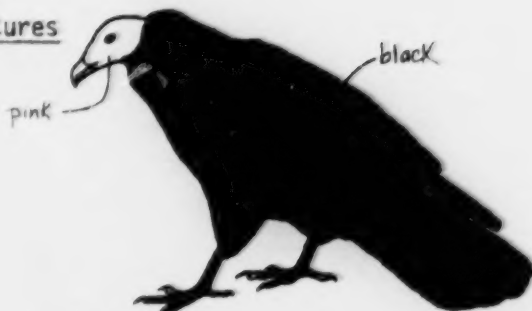
Fish Crow



1. Crows are omnivores. They will eat plant and animal matter.
2. How do you think this is useful to a species of bird? _____

3. Can you name other omnivores? _____

Vultures



Turkey Vulture



Black Vulture

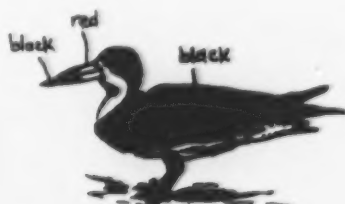
Gull/Crow/Vulture

1. Vultures are scavengers. They eat dead animals. They are part of nature's recycling crew.

2. Draw a picture of the vulture's bill.

3. How do you think the hook on the bill helps these scavengers feed?

4. Why don't they have feathers on their heads? _____



Black Skimmer:

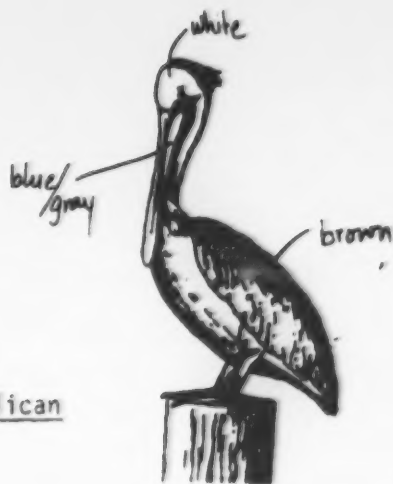
1. What part of this bird's bill is longer, the top or bottom?

2. If you were lucky enough to see the skimmer feeding, how did it use its bill? _____

3. What do you think the skimmer eats? _____



Pied-billed Grebe



Brown Pelican

Pied-billed Grebe

(Although it may look like a duck, it is not one.)

1. "Pied-billed" means having a ring around the bill, and, as you can see if you look closely enough, there is a dark colored line around this grebe's bill. What other birds have you seen today that have a similarly shaped bill? _____

2. Does the pied-billed grebe dive under the water? _____

3. What do you think grebes eat? _____

4. Why did you give this answer? _____

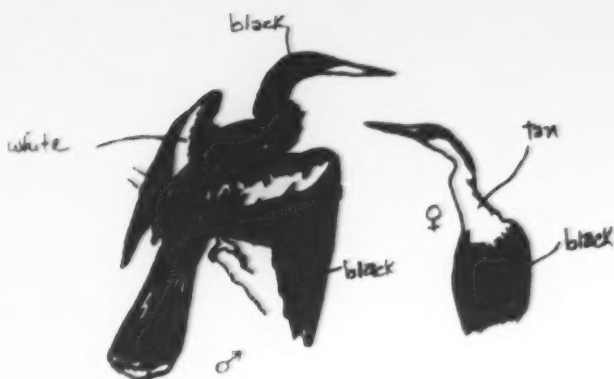
Grebes are one of the best divers of all the water birds and, in some places, people call them "water witches," because of their diving ability.

Brown Pelican

1. Draw a picture of the pelican's bill:
2. When a pelican feeds, it dives into the water with its bill open.
What is this type of bill adapted to catch? _____



1. These birds are called birds of prey because they _____
2. How do you think they catch their prey (food)? _____
3. What kinds of food do they eat? _____



American Anhinga



Doubled-crested Cormorant

Anhinga:

1. This bird is usually found in fresh water areas, and does not produce oil to cover its feathers like the ducks. Why does the anhinga hold its wings out when it sits in the trees? _____
2. From the shape of the anhinga's bill, what do you think it eats? _____

Cormorant

1. The cormorant looks very much like the anhinga, but cormorants are usually found in salt water. How is the bill of the cormorant shaped? Draw a picture of it.
2. The cormorant is another fish eater, but it does not have a spear-like bill. What part of the cormorant's bill helps it catch fish? _____

	Bill Shape	Bill Color	Leg Shape	Leg Color	Foot Shape	Foot Color	Bird Size	Eats
Sparrow								
Cardinal								
Ground Dove								

Ring-billed Gull								
Laughing Gull								

Turkey Vulture								
Black Vulture								
Crow								

Skimmer								
---------	--	--	--	--	--	--	--	--

Grebe								
Brown Pelican								

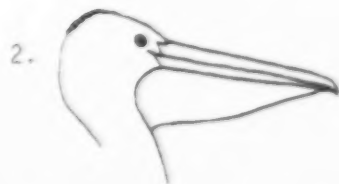
Cormorant								
Anhinga								

American Osprey								
Bald Eagle								
Red-shouldered Hawk								

DARE TO COMPARE

Beside each bird's name write the number of all the adaptations which correspond to that specific type of bird.

Bills and Feet



Bird names

Answers

- | | |
|----------------------|-------|
| A. Great Blue Heron | _____ |
| B. Roseate Spoonbill | _____ |
| C. Blue-winged Teal | _____ |
| D. Anhinga | _____ |
| E. American Coot | _____ |
| F. Pelican | _____ |
| G. Hawk | _____ |

WHO EATS WHAT?

Match the type of food (in left column) with the name of the bird that would eat it.

1. Live fish

2. Shrimp

3. Aquatic plants

4. Seeds

5. Mouse/Snake

a. Great egret

b. Pintail duck

c. Woodstork

d. Cardinal

e. Osprey



Who Eats What?

-28-

REVIEW:

On your field trip you have seen that most birds have special adaptations or body parts that allow them to live better or catch food more easily. Answer these review questions by using the first part of the booklet.

1. Did most of the wading birds have long, or short legs?

2. Did the majority of the wading birds have long pointed bills or round flat bills? _____
3. Did the wading birds have short necks or long necks?

4. Did the wading birds have webbed feet or wide, spreading feet?

5. What do most of the wading birds eat? _____

If you examine your answers to the questions, you can see that the birds' adaptations allow them to obtain food more easily.

This publication is one of the teaching units in the community studies series developed by the Lee County Schools, Florida.

The community study series is designed to assist teachers and students in learning through experience how the Lee County communities function, and the rights and responsibilities each of us shares in maintaining a healthy, productive community.

By systematically experiencing our community, students tend to see the pattern that connects the natural and cultural environment, and how each of us is an independent agent for change.

The community study instructional units have been field tested by teachers and students.

All guides are COPYRIGHTED. Full permission is granted for non-profit educational use.

The units have been produced by the staff of THE DEPARTMENT OF ENVIRONMENTAL EDUCATION AND INSTRUCTIONAL DEVELOPMENT SERVICES of Lee County School system:

Bill Hammond	Director
Jo Ellen Kessler	Acting Director
Craig Hortman	Resource Teacher
Rick Tully	Resource Teacher
Debra Dorsett Hanson	Resource Teacher
Keith Hanson	Resource Teacher
Neil Wilkinson	Resource Teacher
Cindy Bear	Helping Teacher
George Parker	Helping Teacher
Eileen Spencer	Adv. Co. Staff Secretary
Lynette Dean	Secretary

with special contributions from former EE/IDS staff members, Lee County teachers, district staff, students, and members of the community.

Lee County Schools
Environmental Education/
Instructional Development Services
2055 Central Avenue
Fort Myers, Florida 33901
813-275-3033

